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CAD Manual

Appendices



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Appendix 1: Civil 3D Templates

There are two Civil 3D templates; one for surveys/base maps (SV-COS-C3D12.dwt) and one for design (DD-COS-C3D12.dwt).

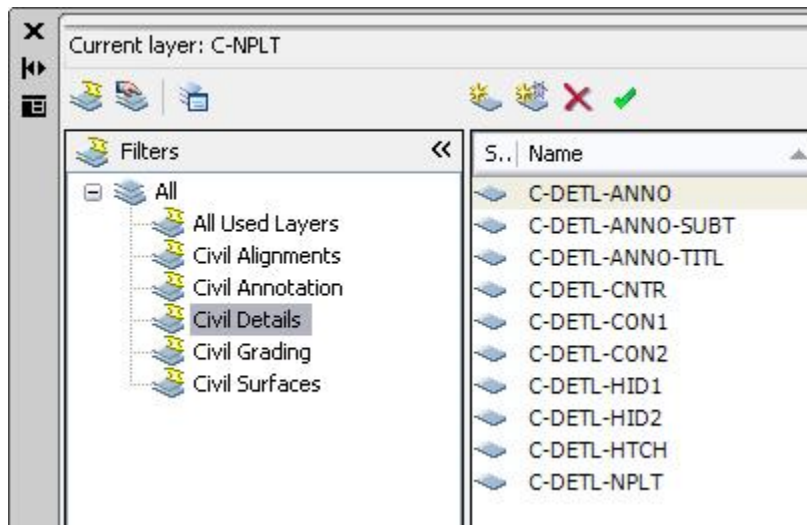
Choose a template based on the kind of drawing you are creating.

Highlighted below are some features in our Civil 3D templates:

- Layer Filters
- Object Styles
- Text Styles
- Multileader Styles
- Dimension Styles
- Table Styles
- Multiline Styles

Layer Filters

The template contains a few pre-built layer filters to help you easily narrow down a large list of layers.



Object Styles

There are a variety of standard styles for Points, Surfaces, Alignments, Profiles, Profile Views, Sections, Section Views, Pipe Networks, Pipes, and Structures contained in the template.

Text Styles

Use the COS text style for all drawing text. The COS text style is annotative. See Appendix 2 for more information on using annotative text.

Multileader Styles

There are standard Multileader styles in the templates. Type MLEADERSTYLE to see them. These Multileader styles are annotative. See Appendix 2 for more information on using annotative Multileaders.

Dimension Styles

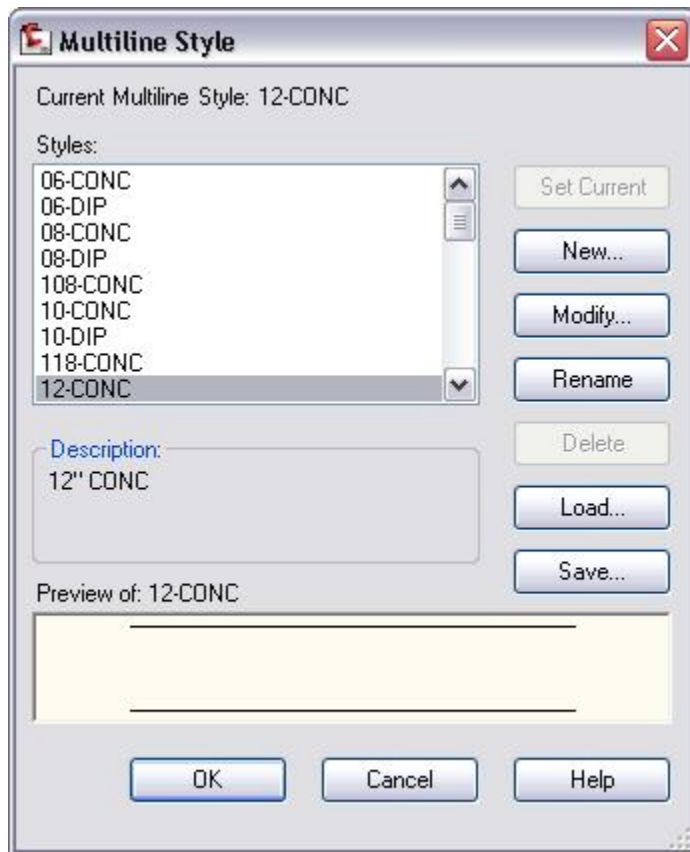
There are standard dimension styles in the templates. Type DDIM to see them. These dimension styles are annotative. See Appendix 2 for more information on using annotative dimensions.

Table Styles

There are standard table styles in the template. Type TABLESTYLE to see them.

Multiline Styles

Multilines may be used to draw pipes in 2D plans and profiles. The “design” Civil 3D template contains a lot of Multiline styles that represent standard pipe sizes. Type MLSTYLE to see the Multiline styles:



In this dialog box you can set a Multiline style current.

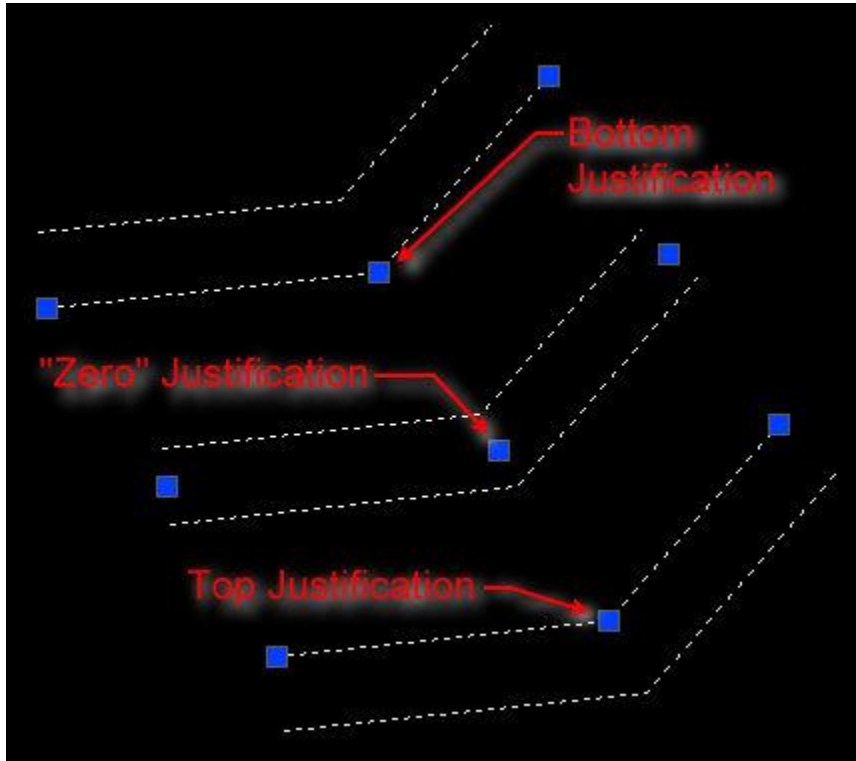
Creating Multilines

To create a Multiline, type MLINE in the command line. You will get this prompt:

Specify start point or [Justification/Scale/STyle]:

J for Justification

A picture says it all:



S for Scale

Don't use this unless you need an exaggeration.

ST for Style

Type the style name exactly as you created it. We have styles created for common pipe sizes. For example a 12" concrete pipe's style would be named 12-CONC. An 18" ductile iron pipe's style would be named 18-DIP.

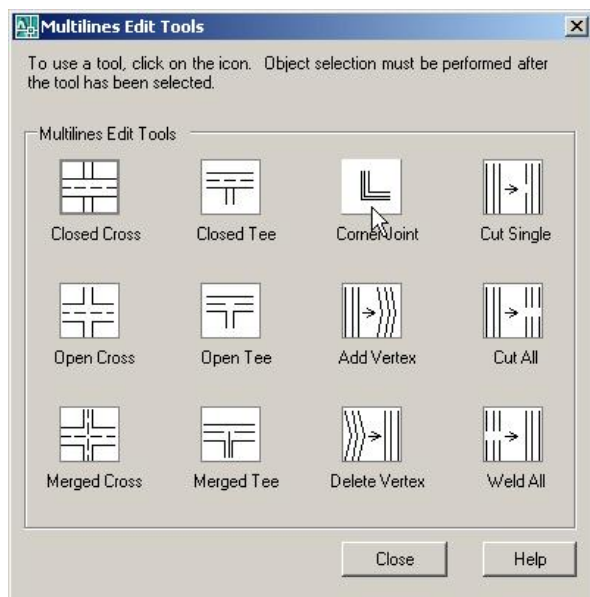
Cleaning Up “Pipe Bends”

When the Multilines are imported, the pipe bends need to be cleaned up (joined). This is simple to do.

Double-click on an multiline or type MLEDIT on the command line.



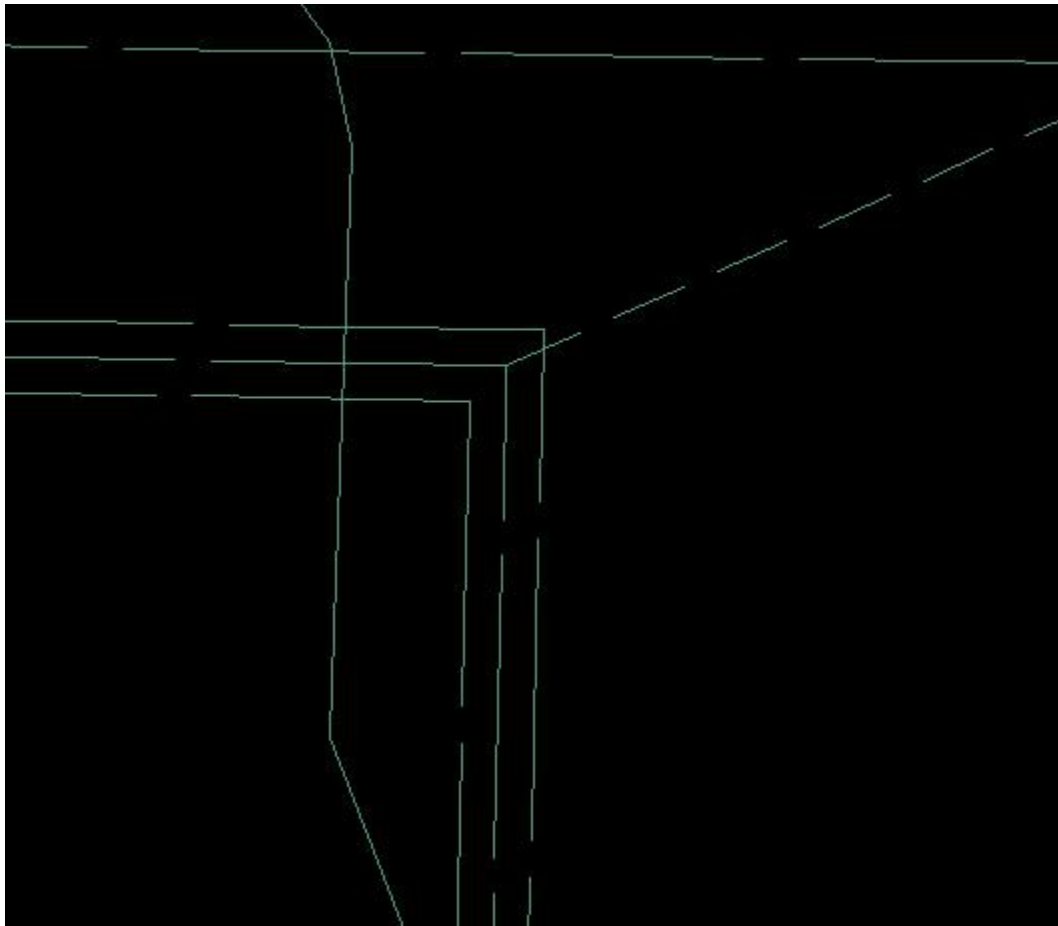
Select “Corner Joint”.



Click on two adjoining multilines.



The final result will be a nice, clean corner in the pipe.



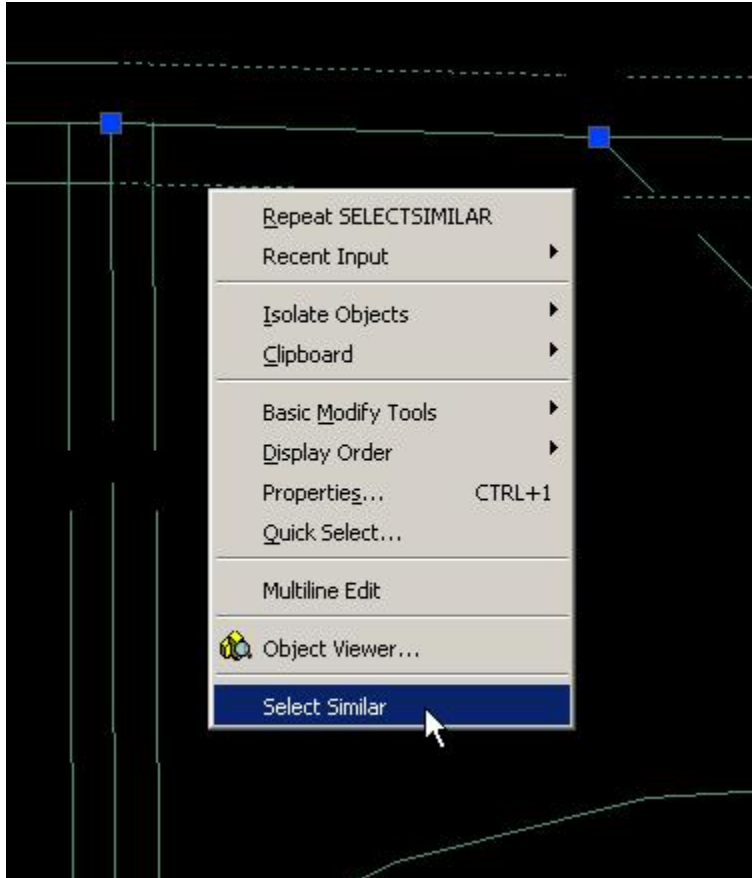
You can use MLEDIT to make clean-looking tees, crossings, and corners. Experiment with it.

Trimming Multilines

You can trim Multilines just like you trim a line. If a multiline passes through a MH block, trim it to the block just like you would trim a line passing through it.

Exploding Multilines

You can explode Multilines and they will convert to normal lines. To explode a bunch of Multilines on the same layer (for example, you may want to explode all the sewer Multilines), select a multiline and right-click to pick “Select Similar”.



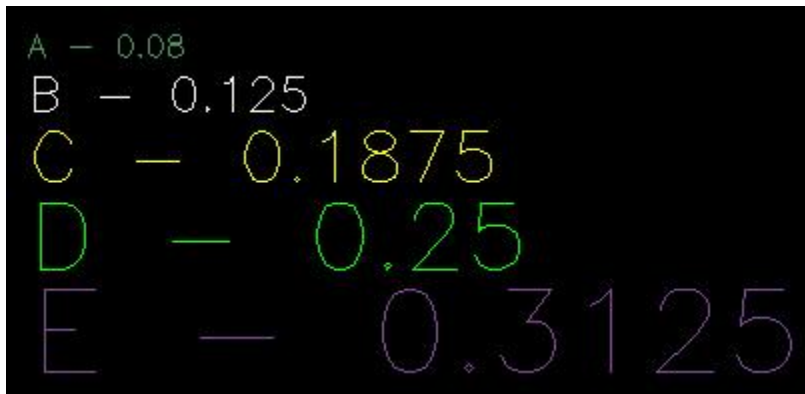
Then type EXPLODE on the command line and all of those Multilines (on that layer only) will now be normal lines.

Appendix 2: Annotation

The AutoCAD help file says, “When you add annotations to your drawing, you can turn on the annotative property for those objects. These annotative objects are scaled based on the current annotation scale setting and are automatically displayed at the correct size.”

Text

Set the text heights to the size you want it to print (1-scale). Then when you set the annotative scale in your drawing, all the text heights will automatically scale up. If your 1-scale text height is 0.125 and you set your annotative scale to 1”=20’, the text (and other annotative objects) will display as 2.5 in a 20-scale drawing.

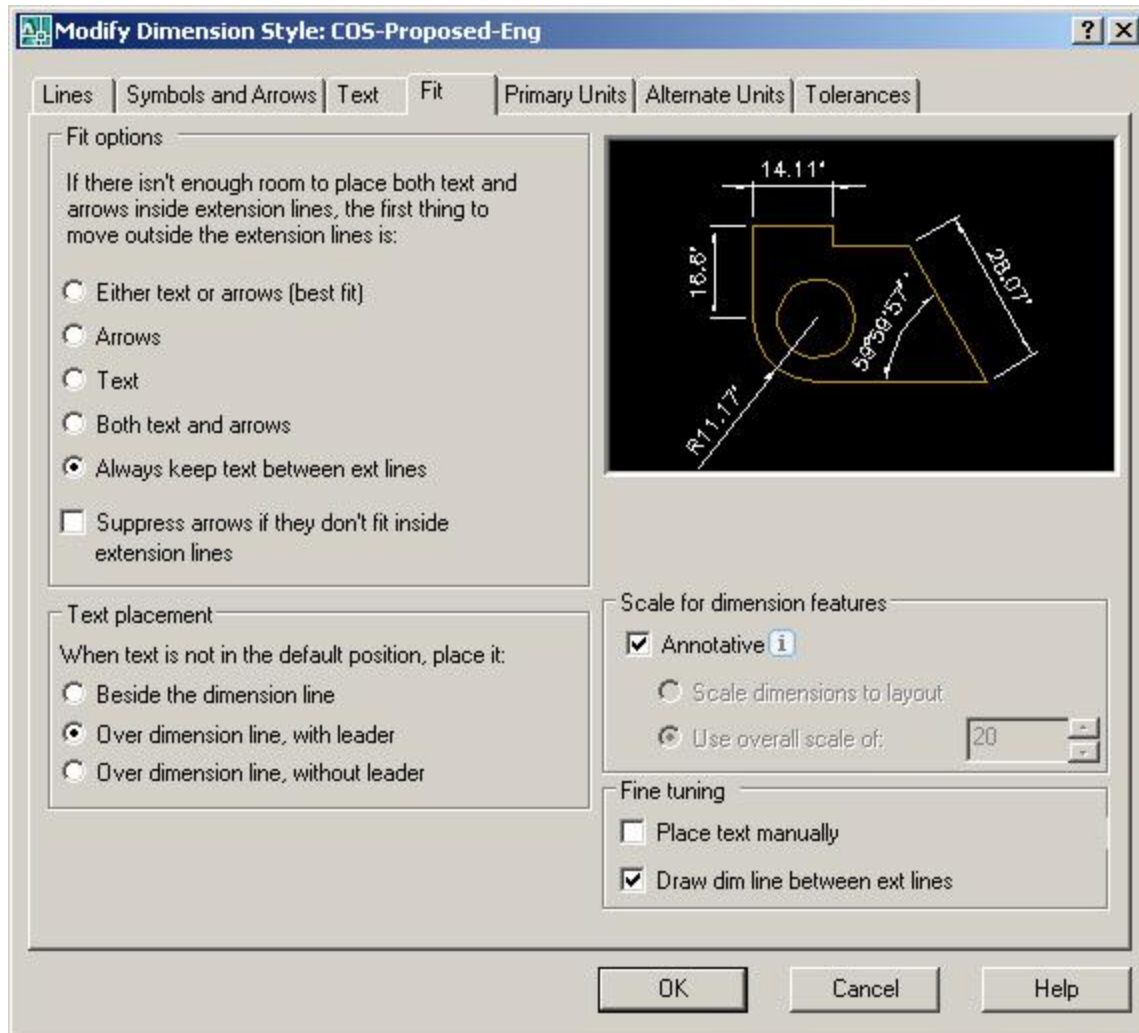


Leaders

We recommend using Multileaders (commands: MLEADER, MLEADERSTYLE) instead of QLEADERS. With a Multileader, the leader is aware of its relationship with the text. It is smart enough to automatically readjust the leader with the text when the annotative scale is changed. Plus when you edit the Multileader style, all your Multileaders are automatically updated.

Dimensions

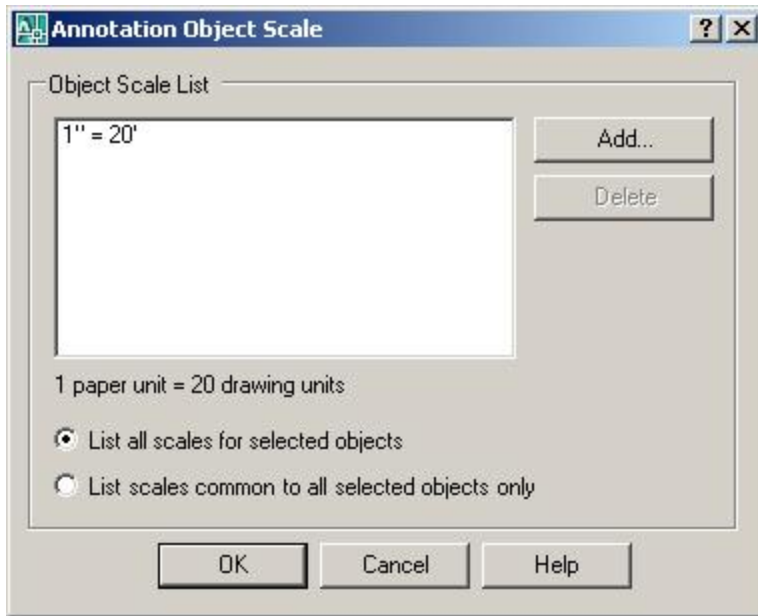
Dimensions should also be set to be annotative. Typically in the past we have chosen to use a static scale associated with dimension styles. If you check the Annotative box in the Modify Dimension Style dialog box (under the “Fit” tab), the static settings will become grayed out.



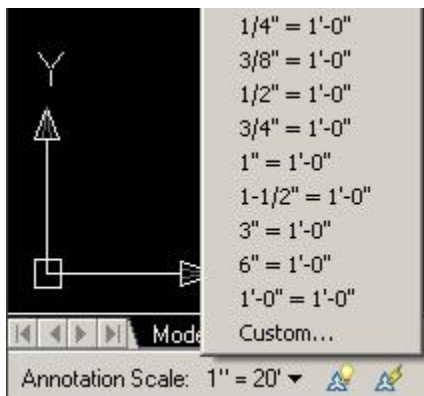
When the dimension styles are set to be annotative, your dimensions will automatically scale when you switch between annotative scales in your drawing.

Best Practices

When you type `OBJECTSCALE` and select an object, most-likely you will see the current annotative scale shown in the Object Scale list box.

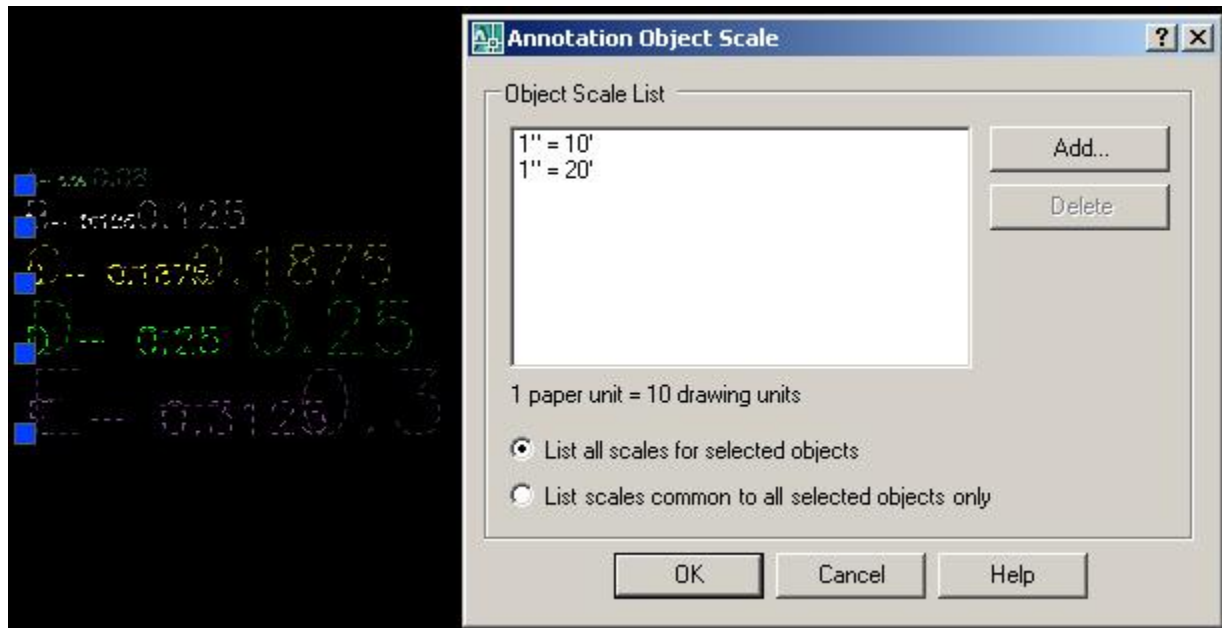


If you have ANNOAUTOSCALE set to 4, when you change the drawings annotative scale...



...the annotative text will automatically update to the selected scale.

For example, if I change the annotative scale from 1"=20' to 1"=10', the objects will automatically have 1"=10' added to it's object scale list.



Appendix 3: Survey Descriptor Codes

Here are standard descriptor codes for surveying.

FIELD CODE	DESCRIPTION	DATA COLLECTION POINT	LAYER	BLOCK NAME
ABUT	ABUTMENT	corner / edge	V-NODE-FNDN-ABUT	
ASPH	ASPHALT	descriptive	V-NODE-ROAD-ASPH	
AV	AIR VALVE	ctr. / size pipe	V-WATR-INST	V-AV
AVNT	AIR VENT	ctr. / size	V-NODE-WATR-INST	
AW	ASPHALT WALK	location	V-NODE-SWLK-ASPH	
AWNG	AWNING	corner / edge	V-NODE-BLDG-OVHD	
AZL	AZIMUTH LONG SIDE (ALIGN PNT.)	directional reference pnt. for feature	V-NODE	
BC	BRASS CAP-HORIZ AND VERT.	loc. - survey info	V-CTRL-HVPT	V-SVBP
BF	BOARD FENCE (SIZE)	loc. / height	V-NODE-FENC-WOOD	
BFGB	BOARD FENCE @ GB	loc. / height	V-NODE-FENC-WOOD	
BH	BOREHOLE - (GENERIC)	loc. - survey info	V-TOPO-BORE	V-TB
BKRK	BIKE RACK	at center of each end w/ width	V-NODE-SITE-BIKE	
BLDG	BUILDING	At angle points, each end and common wall	V-NODE-BLDG	
BLKHD	BULKHEAD	corner / edge	V-NODE-WALL	
BLRD	BOLLARD	location	V-TOPO-POST	V-BLRD
BM	BENCH MARK- VERTICAL ONLY	loc. of project bench marks	V-CTRL-BMRK	V-SVBM
BNCH	BENCH	at center of each end w/ width	V-NODE-SITE-BNCH	
BO	BLOW OFF	ctr. of blow off pipe	V-WATR-INST	V-BO
BRDG	BRIDGE	corner / edge	V-NODE-BRDG	
BRK	BRICK	descriptive	V-NODE-ROAD-BRCK	
BRL	BARREL	CTR OF MH STRUCTURE (VS CTR LID)	V-NODE-UNDR	
BRR	JERSEY BARICADE (SIZE)	ctr. / width	V-NODE-SITE-BARR	
BURIED	BURIED OBJECT	location	V-NODE-UNDR	

FIELD CODE	DESCRIPTION	DATA COLLECTION POINT	LAYER	BLOCK NAME
BUS	BUS SHELTER (SIZE)	ctr, size and directional ref. or multiple corners	V-NODE-BLDG-OTLN	
C	CURB (BACK OF)	top back of curb (note material desc. other than conc.)	V-NODE-ROAD-CURB	
CAB	CABINET (GENERIC)	ctr., size and (directional ref.)	V-POWR-INST	V-CAB
CALC	CALCULATED POINT	calc of Survey record data and/or interpolated points	VJ-NODE	
CATHP	CATHODIC PROTECTION (water)	ctr. / box size	V-NODE-WATR-INST	
CB	CATCH BASIN	ctr., size of casting	V-STRM-MHOL	V-CB151
CC	CONCRETE CULVERT (SIZE)	Invert (unless otherwise noted)	V-NODE-STRM-PIPE	
CG	CURB & GUTTER (SIZE)	width of gutter and material desc.	V-NODE-ROAD-CURB	
CHAR	ARROW- STRAIGHT	channelization-ctr symbol	V-NODE-ROAD-MRKG-LEGN	
CHAR CHEV	ARROW- CHEVRON(S)	channelization-ctr symbol	V-NODE-ROAD-MRKG-LEGN	
CHAR MERG	ARROW- MERGE	channelization-ctr symbol	V-NODE-ROAD-MRKG-LEGN	
CHAR L	ARROW- LEFT	channelization-ctr symbol	V-NODE-ROAD-MRKG-LEGN	
CHAR LR	ARROW- LEFT/RIGHT	channelization-ctr symbol	V-NODE-ROAD-MRKG-LEGN	
CHAR LS	ARROW- LEFT/STRAIGHT	channelization-ctr symbol	V-NODE-ROAD-MRKG-LEGN	
CHAR LRS	ARROW- LEFT/RIGHT/STRAIGHT	channelization-ctr symbol	V-NODE-ROAD-MRKG-LEGN	
CHAR R	ARROW- RIGHT	channelization-ctr symbol	V-NODE-ROAD-MRKG-LEGN	
CHAR RS	ARROW- RIGHT/STRAIGHT	channelization-ctr symbol	V-NODE-ROAD-MRKG-LEGN	
CHSB	STOP BAR	channelization-loc ctr line	V-NODE-ROAD-MRKG-SLNE	

FIELD CODE	DESCRIPTION	DATA COLLECTION POINT	LAYER	BLOCK NAME
CHXW	CROSSWALK	channelization-locate perimeter of striping	V-NODE-ROAD-MRKG-XWLK	
CH2Y	DOUBLE SOLID YELLOW	channelization-loc ctr line	V-NODE-ROAD-MRKG-YELO-SLID	
CHDS	DASHED/SOLID YELLOW	channelization-loc ctr line	V-NODE-ROAD-MRKG-YELO-SLID	
CHSY	SOLID YELLOW	channelization-loc ctr line	V-NODE-ROAD-MRKG-YELO-SLID	
CHDY	DASHED YELLOW	channelization-loc ctr line	V-NODE-ROAD-MRKG-YELO-SEGM	
CHDW	DASHED WHITE	channelization-loc ctr line	V-NODE-ROAD-MRKG-WHIT-SEGM	
CHSW	SOLID WHITE	channelization-loc ctr line	V-NODE-ROAD-MRKG-WHIT-SLID	
CHBL	BIKE LANE	channelization-loc ctr line	V-NODE-ROAD-MRKG-WHIT-SLID	
CHFL	FIRE LANE	channelization-loc ctr line	V-NODE-ROAD-MRKG-FLNE	
CHPK	PARKING	channelization-loc ctr line	V-NODE-ROAD-MRKG-WHIT-SLID	
CHNP	NO PARKING	channelization-loc ctr line	V-NODE-ROAD-MRKG-WHIT-SLID	
CHBK	BIKE SYMBOL	channelization-ctr symbol	V-NODE-ROAD-MRKG-LEGN	
CHSC	SCHOOL SYMBOL	channelization-ctr symbol	V-NODE-ROAD-MRKG-LEGN	
CHHC	HANDICAP SYMBOL	channelization-ctr symbol	V-NODE-ROAD-MRKG-LEGN	
CHHV	HOV SYMBOL	channelization-ctr symbol	V-NODE-ROAD-MRKG-LEGN	
CHON	ONLY SYMBOL	channelization-ctr symbol	V-NODE-ROAD-MRKG-LEGN	
CHRR	RR XING SYMBOL	channelization-ctr symbol	V-NODE-ROAD-MRKG-LEGN	
CHST	STOP SYMBOL	channelization-ctr symbol	V-NODE-ROAD-MRKG-LEGN	
CHBS	TRANSIT ONLY SYMBOL	channelization-ctr symbol	V-NODE-ROAD-MRKG-LEGN	
CHK	CHECK SHOT	loc. - survey info	V-NODE-CHCK	
CIP	CAST IRON PIPE (SIZE)	descriptive	V-NODE-UNID	
CLF	CHAIN LINK FENCE (SIZE)	loc. / height	V-NODE-FENC-STEL	
CMH	COMMUNICATIONS MH	descriptive	V-COMM-MHOL	V-CASTC

FIELD CODE	DESCRIPTION	DATA COLLECTION POINT	LAYER	BLOCK NAME
CMP	CORRUGATED METAL PIPE (SIZE)	Invert (unless otherwise noted) - note material desc.	V-NODE-STRM-PIPE	
CMRA	CAMERA LOCATION	loc. / directional ref. / description	V-CMRA	
CNDTR	CONDUCTOR (ELECTRICAL)	location	V-NODE-POWR-OVHD	
CO	CLEAN OUT (SIZE)	descriptive	V-SSWR-STRC	V-CO
COL	COLUMN (SIZE)	ctr. / size / material	V-SITE-COLS	V-COLUMN
COM	COMMUNICATIONS (LOCATION)	location - generic features	V-NODE-COMM-MRKG	
CONC	CONCRETE	descriptive	V-NODE-ROAD-CONC	
CPP	CORRUGATED PLASTIC PIPE (SIZE)	descriptive	V-NODE-UNID	
CR	CROWN OF ROADWAY	note material desc.	V-NODE-BRKL	
CRK	CREEK-RIVER	thalweg	V-NODE-RIVR	
CTREE	CONIFER TREE (SIZE)	ctr. / size	V-PLNT-CONI	V-CONF-DB
CULV	CULVERT (ANY TYPE) (SIZE)	Invert (unless otherwise noted) - note material desc.	V-NODE-STRM-PIPE	
CVLT	COMMUNICATIONS VAULT	ctr. / size	V-NODE-COMM-MHOL	
CW	CONCRETE WALK (SIZE)	corner / edge	V-NODE-SWLK-CONC	
D	DITCH (CENTERLINE)	ctr.	V-NODE-DTCH	
DBLP	DOUBLE LIGHT POLE	ctr (directional ref. If not parallel)	V-LITE-POLE	V-DBLT
DDM	STORM DRAIN DETENTION MAINTENANCE HOLE	ctr. / size (calc.)	V-STRM-MHOL	V-CASTC
DECK	DECK (ANY TYPE)	corner / edge-- NO ROOF	V-NODE-BLDG-DECK	
DIP	DUCTILE IRON PIPE (SIZE)	descriptive	V-NODE-UNID	
DTREE	DECIDUOUS TREE (SIZE)	ctr. / size	V-PLNT-DECI	V-DECID
DWY	DRIVEWAY	corner / edge	V-NODE-DRIV	
E	EAST (direction)	descriptive	V-NODE	

FIELD CODE	DESCRIPTION	DATA COLLECTION POINT	LAYER	BLOCK NAME
EBLK	ECOLOGY (SIZE)	ctr., size and (directional ref.)	V-NODE-SITE-BARR	V-ECOBK
ECD	ELECTRICAL CONDUIT	location	V-NODE-POWR	
ED	ELECTRICAL DUCT	location	V-NODE-POWR	
EHH	ELECTRIC HANDHOLE (SIZE)	ctr., size and (directional ref.)	V-POWR-INST	V-HH
EINS	ELECTRICAL INSULATOR	location	V-NODE-POWR	
ELEC	ELECTRIC (LOCATION)	location - generic features	V-NODE-POWR-MRKG	
EMH	ELECTRIC MAINTENANCE HOLE	descriptive	V-POWR-MHOL	V-CASTC
ENT	ENTRYWAY / DOORWAY	location	V-NODE-TOPO-SPOT	
EOA	EDGE OF ASPHALT	corner / edge	V-NODE-ROAD-ASPH	
EOC	EDGE OF CONCRETE	corner / edge	V-NODE-ROAD-CONC	
EOG	EDGE OF GRAVEL	angle pnt. / edge	V-NODE-ROAD-GRVL	
EOW	EDGE OF WATER	angle pnt. / edge	V-NODE-SITE-EWAT	
EVL	ELECTRIC VAULT	descriptive	V-POWR-MHOL	
F	FENCE (ANY TYPE / SIZE)	loc. / height / material	V-NODE-FENC	
FGB	FENCE @ GB	loc. / height / material	V-NODE-FENC	
FF	FINISHED FLOOR ELEV.	location	V-NODE-TOPO-SPOT	
FL	FLOW LINE	location	V-NODE-BRKL	
FO	FIBER OPTIC (UTILITY LOCATION)	location - LINE for paint marks, single SHOT for marker	V-NODE-COMM-FIBR-MRKG	
FOC	FACE OF CURB	location	V-NODE-ROAD-CURB	
FSTP	FIRE STAND PIPE	ctr. / size	V-NODE-FIRE-PIPE	
FTG	FOOTING	corner / edge	V-NODE-FNDN-FTNG	
G	GUTTER (CURB)	location	V-NODE-ROAD-CURB	
GAS	GAS (UTILITY LOCATION)	location - LINE for paint marks, single SHOT for marker	V-NODE-NGAS-MRKG	

FIELD CODE	DESCRIPTION	DATA COLLECTION POINT	LAYER	BLOCK NAME
GATE	GATE (ANY TYPE)	loc. / height	V-NODE-FENC	
GB	GRADE BREAK	location	V-NODE-BRKL	
GIP	GALVANIZED IRON PIPE	ctr. / size (note ie. or top)	V-NODE-UNID	
GM	GAS METER	location	V-NGAS-INST	V-GM
GND	GROUND	location	V-NODE-TOPO-SPOT	
GP	GUY POLE	location (shot immediate after assoc. pole)	V-SITE-POLE	V-GP
GREG	GAS REGULATOR	location	V-NGAS-INST	V-GREG
GRL	GUARD RAIL	location	V-NODE-FENC-GRAL	
GRS	GRASS/LAWN	descriptive	V-NODE-PLNT-TURF	
GRT	GRATE STEEL	ctr. / size DESC REQ	V-NODE-UNID-MHOL	
GRVL	GRAVEL	descriptive	V-NODE-ROAD-GRVL	
GTV	GATE VALVE	loc. (ctr. nut) / size pipe	V-WATR-INST	V-GV-DB
GUY	GUY ANCHOR	location (shot immediate after assoc. pole)	V-SITE-POLE	V-GUY
GV	GAS VALVE	location	V-NGAS-INST	V-GV-DB
HBR	HOSE BIB RISER (water)	ctr., size and (directional ref.)	V-NODE-WATR-PIPE	
HDG	HEDGE ROW	location - at ends and height	V-NODE-PLNT-BUSH	
HH	HANDHOLE (GENERIC) (SIZE)	ctr., size and (directional ref.)	V-UNID	V-HH
HT	HUB / TACK	loc. - survey info	V-CTRL	V-SVHUB
HUB	SURVEY HUB	contruction staking	VF-NODE-TOPO-CSTG	
HWALL	HEADWALL	location - at ends	V-NODE-WALL	
HYD	FIRE HYDRANT	ctr. (directional ref.)	V-FIRE-HYDR	V-HYD
IE	INVERT ELEVATION	invert elev. of all physical features other than culverts.	V-NODE-UNID	

FIELD CODE	DESCRIPTION	DATA COLLECTION POINT	LAYER	BLOCK NAME
INL	INLET (SIZE)	If ON curb - ctr back of inlet, size and (directional ref.) If NOT on curb - ctr., size and (directional ref.)	V-STRM-STRC	V-EINL250A
IP	IRON PIPE	descriptive	V-CTRL	V-SVRB
IRRG	IRRIGATION BOX	descriptive	V-IRRG-EQPM	<i>coming soon</i>
IRV	IRRIGATION VALVE	location	V-IRRG-VALV	V-IRRGV
JB	JUNCTION BOX (SIZE)	ctr., size and (directional ref.)- ELECTRICAL	V-POWR-INST	V-JB
LATH	LATH SURVEY	construction staking	VF-NODE-TOPO-CSTG	
LID	CONC. LID	exposed conc. lid to vault, chamber, box	V-NODE-UNID-MHOL	
LP	LIGHT POLE	ctr. (directional ref.)	V-LITE-POLE	V-LP
LS	LANDSCAPE	descriptive	V-NODE-PLNT-BEDS	
LT	LANDSCAPE TIMBER	ctr. / width	V-NODE-PLNT-EDGR	
LUM	LUMINAIRE	location	V-LITE-POLE	V-LUM
MAG	MAG NAIL	loc. - survey info	V-CTRL	V-SVTK
MBOX	MAIL BOX (BLUE / US POSTAL)	ctr., size and (directional ref.) (U.S. Postal)	V-SITE-MAIL	V-MAIL-US
MH	MAINTENANCE HOLE (GENERIC)	descriptive	V-UNID-MHOL	V-CASTC
MC	MON CASE	location of casting only- ctr./size	V-CTRL	V-CASTC
MIC	MONUMENT IN CASE	loc. - survey info	V-CTRL-HCPT	V-SVMIC
MON	CONCRETE MONUMENT	loc. - survey info	V-CTRL-HCPT	V-SVMON
MPOLE	METAL POLE	location	V-SITE-POLE	V-PP
MRKE	MARKER POST- ELEC)	ctr./ size/ desc- Utility (carsonite,	V-POWR-MRKG	V-POST

FIELD CODE	DESCRIPTION	DATA COLLECTION POINT	LAYER	BLOCK NAME
		conc, BC, etc)		
MRKG	MARKER POST- GAS, PET, OIL	ctr./ size/ desc- Utility (carsonite, conc, BC, etc)	V-NGAS-MRKG	V-POST
MRKC	MARKER POST- COMM, FO	ctr./ size/ desc- Utility (carsonite, conc, BC, etc)	V-COMM-MRKG	V-POST
MRKW	MARKER POST- WATER	ctr./ size/ desc- Utility (carsonite, conc, BC, etc)	V-WATR-MRKG	V-POST
MW	MONITORING WELL	location	V-WATR-INST	V-MWELL
N	NORTH (direction)	descriptive	V-NODE	
OHB	OVERHEAD BUILDING LINES	carports/bldgs- NOT IN TIN	V-NODE-BLDG-OVHD	
OHP	OVERHEAD POWER		V-NODE-POWR-OVHD	
PAD	CONC. PAD/SLAB	concret pad / slab - not vault lid	V-NODE-PVMT-CONC	
PATH	PATH / TRAIL	ctr. / width	V-NODE-TRAL	
PC	PIPE / CAP	loc. - survey info	V-CTRL	V-SVRB
PDP	PERFORATED DRAIN PIPE (SIZE)	ctr. / size (note ie. or top)	V-NODE-STRM-PIPE	
PEDSP	PEDESTRIAN SIGNAL PEDESTAL	location	V-ROAD-SIGL-FIXT	V-PEDP
PIER	PIER-STRUCTURAL	corner / edge	V-NODE-FNDN-PIER	
PIL	PILING	ctr. / size	V-NODE-FNDN-PILE	
PIPE	PIPE (GENERIC / SIZE)	ctr. / size (note ie. or top)	V-NODE-UNID-PIPE	
PK	PK NAIL	loc. - survey info	V-CTRL	V-SVTK
PM	PARKING METER	location	V-PRKG-FIXT	V-PRKM
POLE	POLE (GENERIC / SIZE)	ctr	V-UNID-POLE	V-PP
POST	POST (SIZE)	location / material	V-SITE-POST	V-POST
PP	POWER POLE	location / material	V-POWR-POLE	V-PP
PPB	PEDESTRIAN PUSH BUTTON	location	V-ROAD-SIGL-FIXT	V-PPB
PPBP	PEDESTRIAN PUSH BUTTON PEDESTAL	location	V-ROAD-SIGL-FIXT	V-PPBP

FIELD CODE	DESCRIPTION	DATA COLLECTION POINT	LAYER	BLOCK NAME
PPLT	POWER POLE W/ LIGHT	ctr. (directional ref.)	V-POWR-POLE	V-PPLT
PRKG	PARKING AREA	corner / edge	V-NODE-PKRG	
RBOX	RECORDING BOX (water)	ctr., size and (directional ref.)	V-WATR-INST	V-CAB
RC	REBAR / CAP	loc. - survey info	V-CTRL	V-SVRB
RDWY	ROADWAY-UNPAVED	location	V-NODE-ROAD-UPVD	
RET	RETAINING WALL (ANY TYPE)	top center of ret-wall @ angle pts. and GB's	V-NODE-WALL-RTWL	
RIP	RIPRAP	location - perimeter	V-NODE-RRAP	
RIT	ROUND INLET TOP (SIZE)	ctr. / size	V-STRM-MHOL	V-CB-RND
RKY	ROCKERY (SIZE)	location - perimeter	V-NODE-ROCK	
RLNG	RAILING	loc. / height	V-NODE-FENC-HRAL	
RMAIL	MAIL BOXES (RESIDENTIAL)	ctr., size and (directional ref.) (each end rack)	V-SITE-MAIL	V-MAIL-PV
ROCK	ROCK (ANY TYPE)	ctr., size and (directional ref.)	V-ROCK	V-ROCK
RR	RAILROAD (LOCATION)	location - generic features - DESC REQ	V-NODE-RAIL	
RRAIL	RAILROAD RAIL (TOP CENTER)	location - top center	V-NODE-RAIL-TRAK	
RRF	RAILROAD FROG	location	V-NODE-RAIL-EQPM	
S	SOUTH (direction)	descriptive	V-NODE	
SAN	SANITARY (location)-UTILITY LOCATES	location - generic features	V-NODE-SSWR-MRKG	
SB	SAND BOX	ctr., size and (directional ref.)	V-STRM-STRC	V-SB
SCRB	SURVEY SCRIBE MARK	loc. - survey info	V-NODE-CTRL	
SD	SERVICE DRAIN	size-outlet drain at curb or	V-NODE-STRM-LATL	

FIELD CODE	DESCRIPTION	DATA COLLECTION POINT	LAYER	BLOCK NAME
		downspouts		
SDMH	STORM DRAIN MH	ctr. / size	V-STRM-MHOL	V-CASTC
SFB	SEE FIELD BOOK	survey info	V-NODE-ANNO	
SH	SPRINKLER HEAD	location	V-IRRG-SPKL	V-SPRKHD
SHLDR	SHOULDER	location - note material desc.	V-NODE-ROAD-UPVD	
SHRUB	SHRUB (ANY TYPE / SIZE)	ctr., size and (directional ref.)	V-PLNT-SHRB	V-SHRUB
SIGN	SIGN (ANY TYPE)	location---description	V-SITE-SIGN	V-SNS
SL	STREET LIGHT	location (directional ref.)	V-LITE-POLE	V-LP
SLHH	STREET LIGHT HH	ctr., size and (directional ref.)	V-POWR-INST	V-HH
SMH	SANITARY SEWER MAINTENANCE HOLE	descriptive	V-SSWR-MHOL	V-CASTC
SP	STRAIN POLE	location	V-POWR-POLE	V-SP
SPK	SPIKE (SURVEY PNT.)	loc. - survey info	V-CTRL	V-SVTK
SPLT	STRAIN POLE W/ LIGHT	location (directional ref.)	V-POWR-POLE	V-SPLT
STM	STEAM (UTILITY LOCATION)	location - LINE for paint marks, single SHOT for marker	V-NODE-STEM-MRKG	
STEP	STAIRWAYS	location - btm. of btm. step and top of top step	V-NODE-SWLK-STEP	
STK	STAKE (SURVEY PNT.)	loc. - survey info	V-NODE	
STLP	STEEL PIPE (SIZE)	location	V-NODE-UNID-PIPE	
STMH	STEAM MAINTENANCE HOLE	descriptive	V-STEM-MHOL	V-CASTC
STRM	STORM (UTILITY LOCATION)	location - LINE for paint marks, single SHOT for marker	V-NODE-STRM-MRKG	
STUMP	STUMP (SIZE)	ctr. / size	V-PLNT-TREE	V-STUMP

FIELD CODE	DESCRIPTION	DATA COLLECTION POINT	LAYER	BLOCK NAME
SV	SPRINKLER VALVE	location	V-IRRG-VALV	V-IRRGV
SWALE	SWALE	location	V-NODE-STRM-DTCH	
TB	TEST BORE	loc. - survey info	V-TOPO-BORE	V-TB
TC	TREE CANOPY	location	V-NODE-PLNT-TREE	
TCD	TELEPHONE CONDUIT	location	V-NODE-COMM	
TD	TELEPHONE DUCT	location	V-NODE-COMM	
TEB	TELEPHONE ENCLOSURE BOX (SIZE)	ctr., size and (directional ref.)	V-COMM-INST	V-TELENCL
TEL	TELEPHONE (UTILITY LOCATION)	location - LINE for paint marks, single SHOT for marker	V-NODE-COMM-MRKG	
THWG	THALWEG	ctr line creek/creek bed	V-NODE-RIVR	
TK	TACK	loc. - survey info	V-CTRL	V-SVTK
TL	TACK / LEAD	loc. - survey info	V-CTRL	V-SVTK
TLC	TACK / LEAD (COPPER TACK)	loc. - survey info	V-CTRL	V-SVTK
TOE	TOE (GROUND)	location	V-NODE-BRKL-BOTB	
TOP	TOP (GROUND)	location	V-NODE-BRKL-TOPB	
TP	TELEPHONE POLE	location	V-COMM-POLE	V-TP
TPED	TELEPHONE PEDESTAL	ctr., size and (directional ref.)	V-COMM-INST	V-TELENCL
TR	TRASH RACK	ctr., upstream edge	V-NODE-STRM-STRC	
TRL	TRAFFIC SIGNAL LOOPS	ctr, size and multiple corners	V-NODE-ROAD-SIGL-LOOP	
TRSB	TRAFFIC SIGNAL CONTROL BOX	ctr., size and (directional ref.)	V-ROAD-SIGL-INST	V-CAB
TRSG	TRAFFIC SIGNAL ON SPAN WIRE	location	V-ROAD-SIGL-FIXT	V-SIGNBK
TRSP	TRAFFIC SIGNAL POLE	location	V-ROAD-SIGL-FIXT	V-TRSP
TSA	TRAFFIC SIGNAL MAST ARM		V-ROAD-SIGL-FIXT	V-SIG
TCHH	TRAFFIC CONTROL HH	ctr., size and	V-ROAD-SIGL-INST	V-HH

FIELD CODE	DESCRIPTION	DATA COLLECTION POINT	LAYER	BLOCK NAME
		(directional ref.)		
UG	UNDERGROUND	below ground surface (excluding Inverts)	V-NODE-SITE-UNDR	
UGS	UNDERGROUND SERVICE	descriptive	V-NODE-SITE-UNDR	
UP	UTILITY POLE	location	V-POWR-POLE	V-PP
UTIL	UTILITY CORRIDOR	location	V-NODE-UNID	
UW	UNDER WATER	descriptive	V-NODE-TOPO	
VENT	VENT (any type / size)	location (height) - generic features	V-NODE-SITE-VENT	
VL	VEGETATION LINE	location	V-NODE-PLNT	
VLT	VAULT (ANY TYPE / SIZE)	descriptive	V-NODE-UNID-STRC	
W	WEST (direction)	descriptive	V-NODE	
WALL	WALL (ANY TYPE)	ctr., size and (directional ref.)	V-NODE-WALL	
WCR	WHEEL CHAIR RAMP	corner	V-NODE-SWLK-RAMP	
WEIR	WEIR	location	V-NODE-SITE-WEIR	
WF	WETLAND DELINEATION	location (marker number)	V-WETL	V-FLAG
WGV	WATER GATE VALVE CHAMBER	maintenance hole location	V-WATR-MHOL	V-WGV
WIF	WROUGHT IRON FENCE (SIZE)	location (height)	V-NODE-FENC-STEL	
WIFGB	WROUGHT IRON FENCE @ GB	location (height)	V-NODE-FENC-STEL	
WMH	WATER MH	descriptive	V-WATR-MHOL	V-WGV
WML	WATER METER BOX (LARGE)	ctr., size and (directional ref.)	V-WATR-INST	V-WM
WMS	WATER METER BOX (SMALL)	ctr., size and (directional ref.)	V-WATR-INST	V-WM
WMR	WATER METER BOX (ROUND)	ctr., diameter	V-WATR-INST	V-CASTC
WP	WOOD POLE	location	V-UNID-POLE	V-PP
WSTP	WHEEL STOP - PARKING	ctr. / width	V-NODE-PRKG-FIXT	

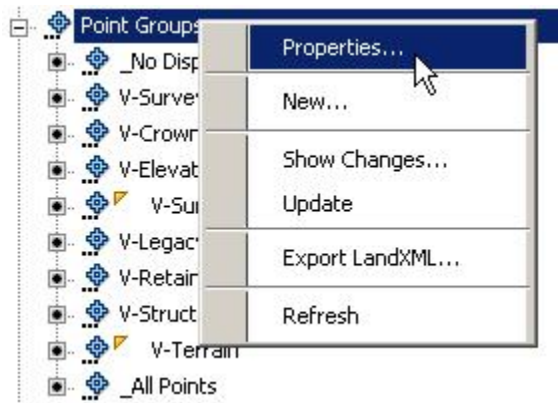
FIELD CODE	DESCRIPTION	DATA COLLECTION POINT	LAYER	BLOCK NAME
WTR	WATER (UTILITY LOCATION)	location - LINE for paint marks, single SHOT for marker	V-NODE-WATR-MRKG	
WTS	WATER TEST STATION	ctr., diameter	V-NODE-WATR-INST	
WV	WATER VALVE	location (sml. Casting)	V-WATR-INST	V-GV
WVLT	WATER VAULT (SIZE)	descriptive	V-NODE-WATR-STRC	
XA	EXTRUDED ASPH EDGE	corner / edge	V-NODE-ROAD-ASPH	
XC	EXTRUDED CURB	inside (face) corner / edge	V-NODE-ROAD-CURB	
XJ	EXPANSION JOINT	location (bridge, etc.)	V-NODE-BRDG-EXPJ	
XP	TRANSMISSION POLE	ctr. / size	V-POWR-POLE	V-XP

Appendix 4: Working With Point Groups

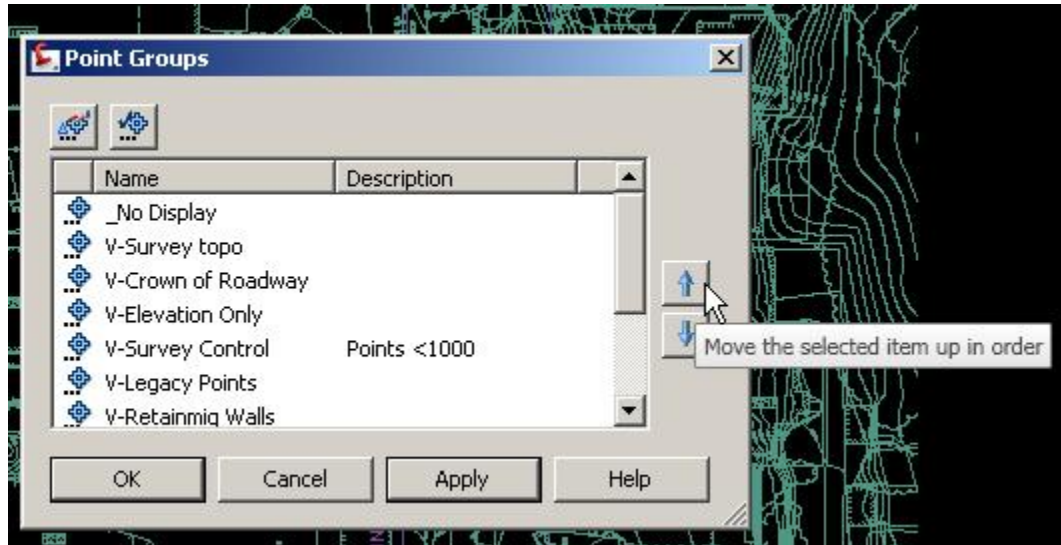
As a standard practice, a “_No Display” point group is created along with various other groups under the “Point Groups” section in the Prospector tab of the Toolspace (command: SHOWTS).



To change the display of points in a drawing, right-click on “Point Groups” and select “Properties...”



Point groups are displayed based on hierarchy. Whatever point group is on the top takes priority over all other point groups under it. If “_No Display” is on top, no points will be displayed in the drawing.



Move a point group to the top to see the points contained within that group.

Appendix 5: Working With Pipe Networks

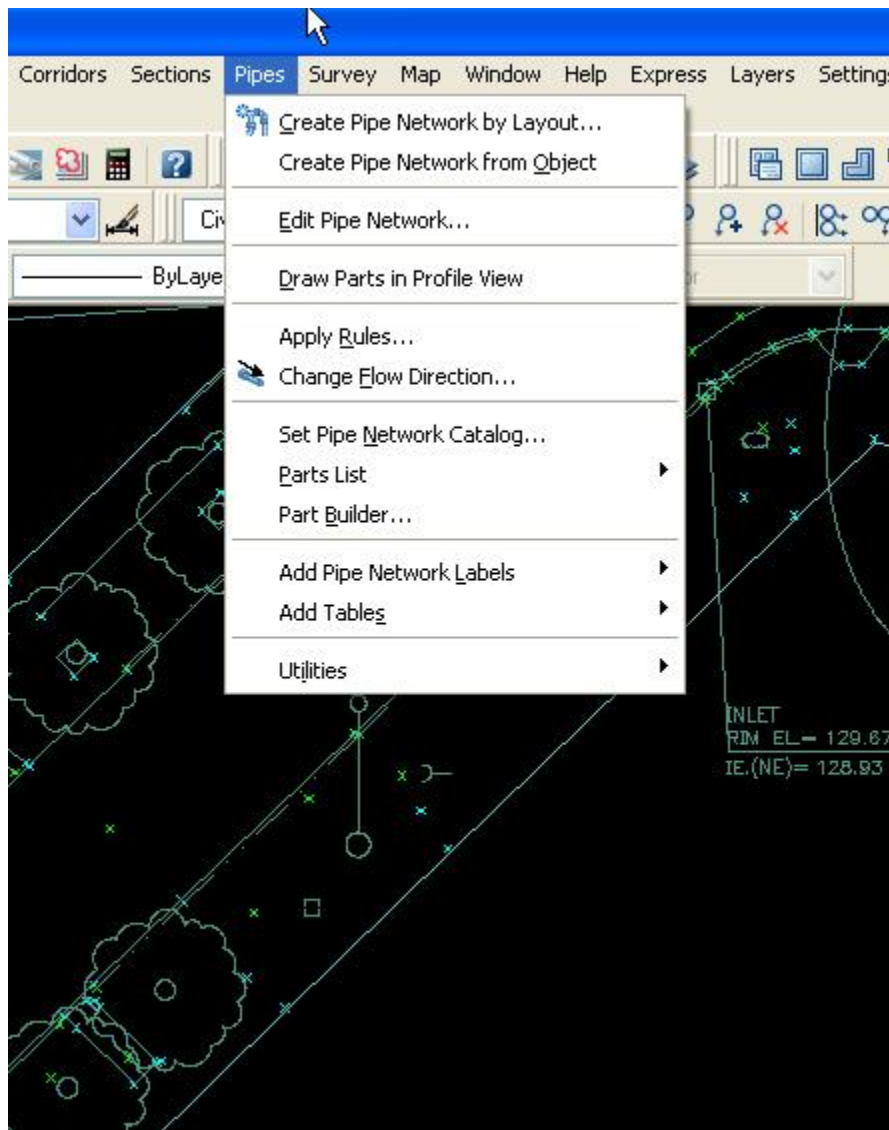
Pipe Networks are a very useful tool that creates underground utilities in a 3D model. This helps to find problems when creating a design.

Create a New Pipe Network

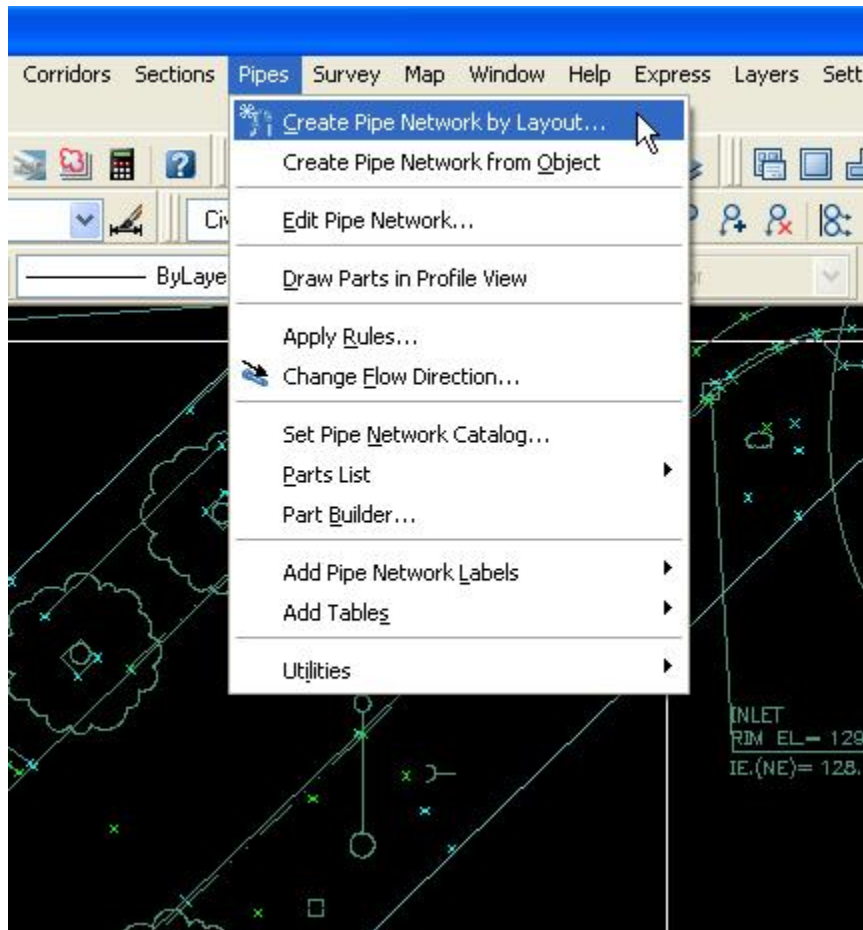
You can start a new pipe network two different ways:

- Select the pull-down menu: Pipes → Create Pipe Network by Layout...
- Select the pull-down menu: Pipes → Create Pipe Network from Object

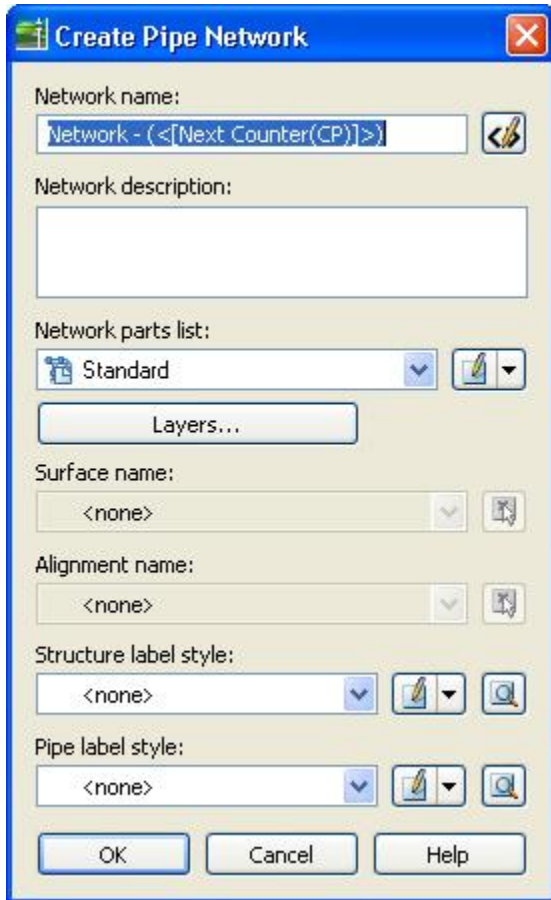
Creating by layout means that you can just start picking points to create a pipe network. Creating by object means that you can turn feature lines into a pipe network. Most of the time for the base map group we will use the "Create Pipe Network by Layout" option.



Start by creating a pipe network by layout (see following picture).



After selecting create pipe network by layout, a new dialog box will pop out (see following picture).

The image shows a Windows-style dialog box titled "Create Pipe Network". It contains several input fields and buttons. The "Network name:" field has the text "Network - (<[Next Counter(CP)]>". The "Network description:" field is empty. The "Network parts list:" section has a dropdown menu set to "Standard" and a "Layers..." button. The "Surface name:" field is set to "<none>". The "Alignment name:" field is also set to "<none>". The "Structure label style:" and "Pipe label style:" fields are both set to "<none>". At the bottom are "OK", "Cancel", and "Help" buttons.

Create Pipe Network

Network name:
Network - (<[Next Counter(CP)]>)

Network description:

Network parts list:
Standard
Layers...

Surface name:
<none>

Alignment name:
<none>

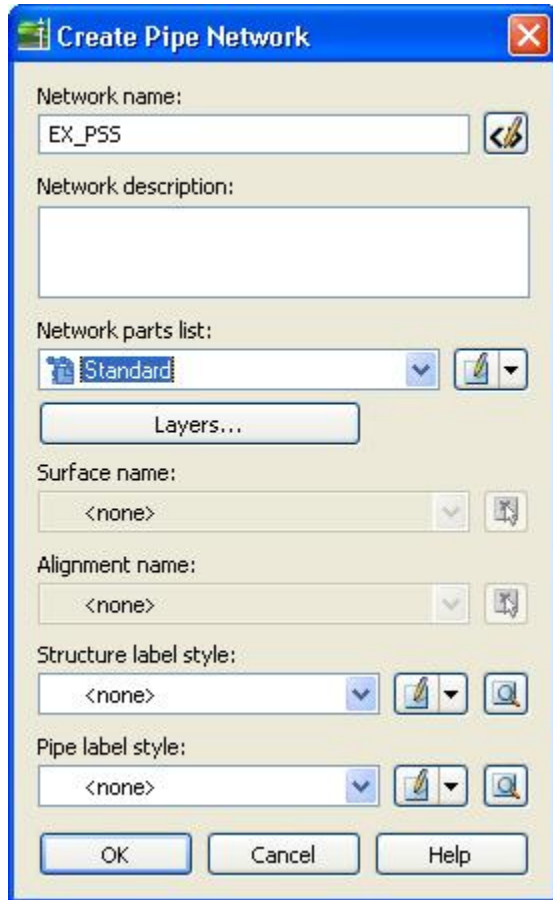
Structure label style:
<none>

Pipe label style:
<none>

OK Cancel Help

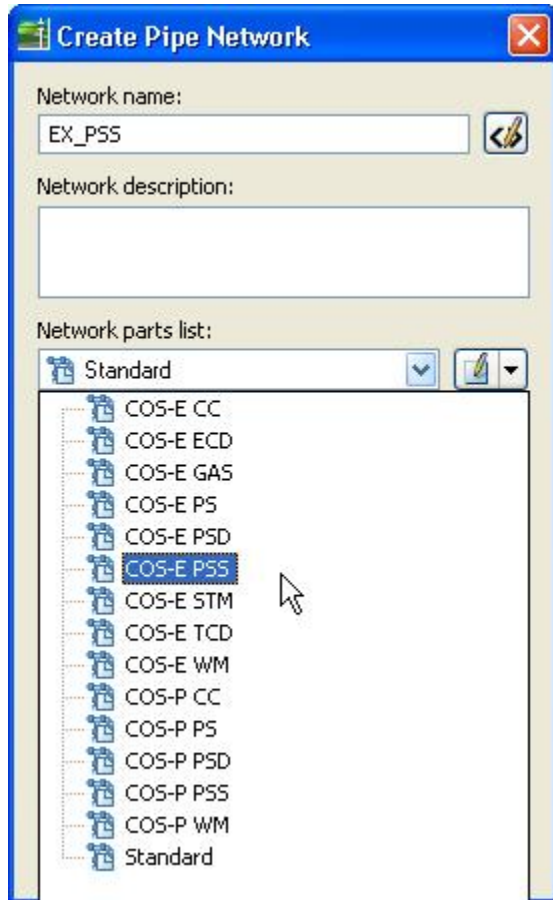
Fill out all of the information that it asks for. For the network name, name it the function of the utility that you are creating. For example if you are creating an existing sanitary sewer network you would want to call it EX_PSS.

If you are creating an existing storm network you might want to call it EX_PSD (see following picture).

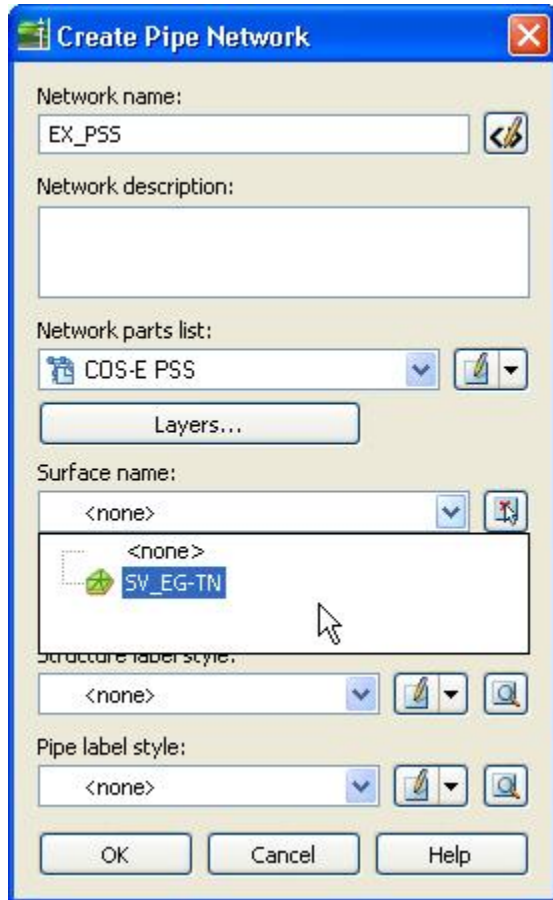


For the network description box you might want to add something that lets other people know what is going into this network. It is not necessary to put anything in this box.

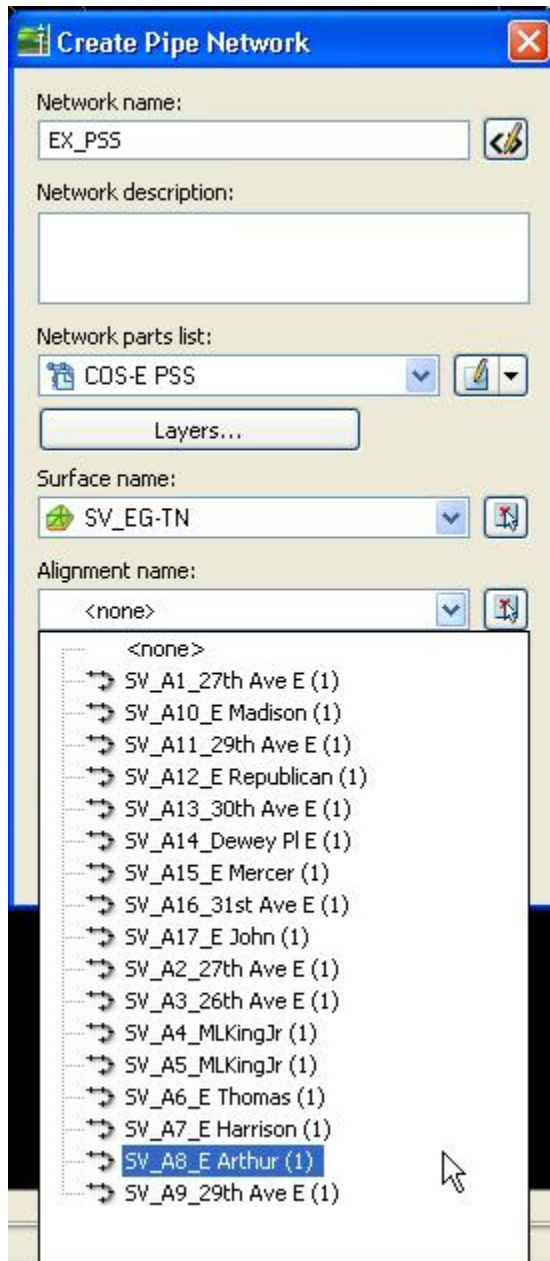
For the network parts list you want to select the type of utility that you are creating (see following picture).



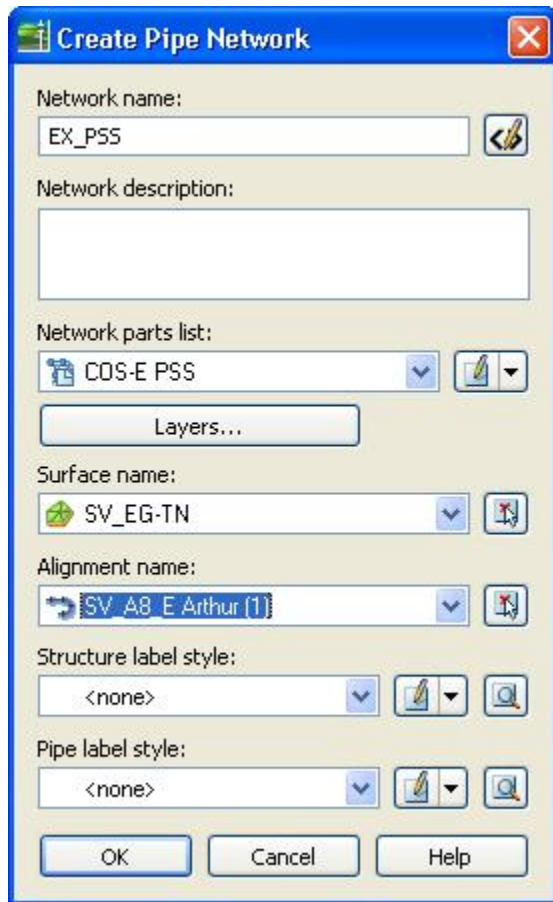
Once that is selected now you can select the surface name. Pick the existing ground (see following picture).



And finally you will want to select the alignment of the street that the pipe will run along (see following picture).



When everything you need is filled out it should look something like this (see following picture):

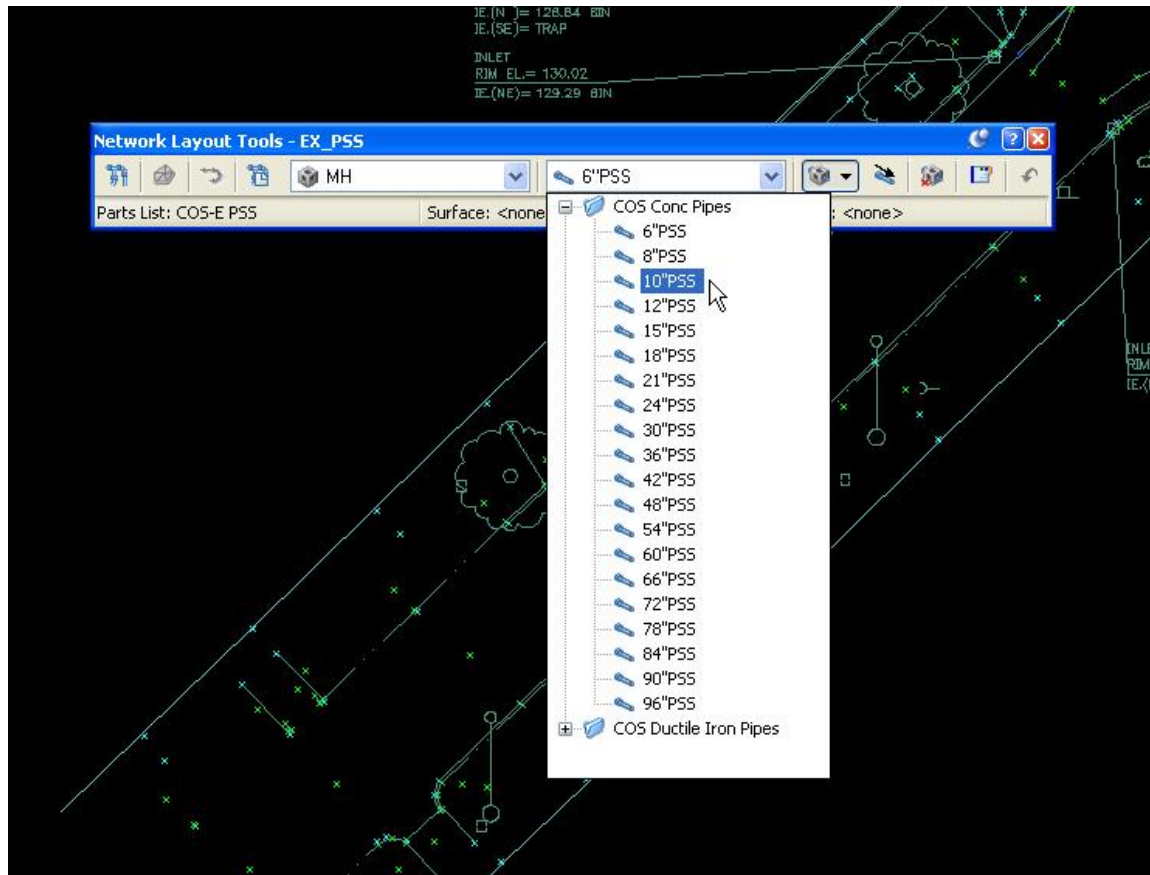


Click OK to start adding in structures and pipes. The first thing that pops up is the Network Layout Tool Bar (see following picture).



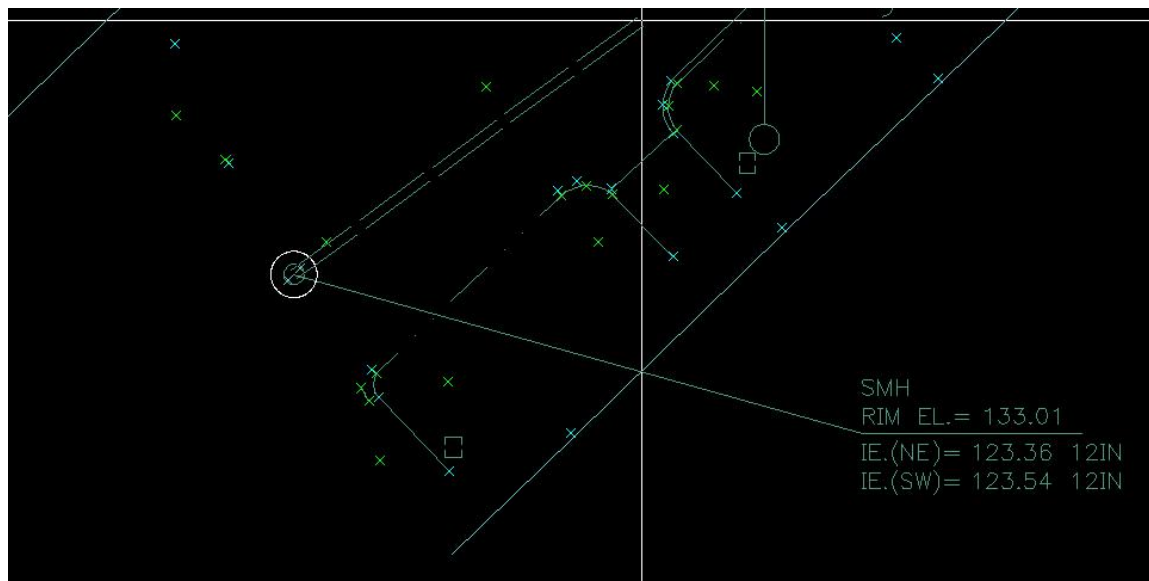
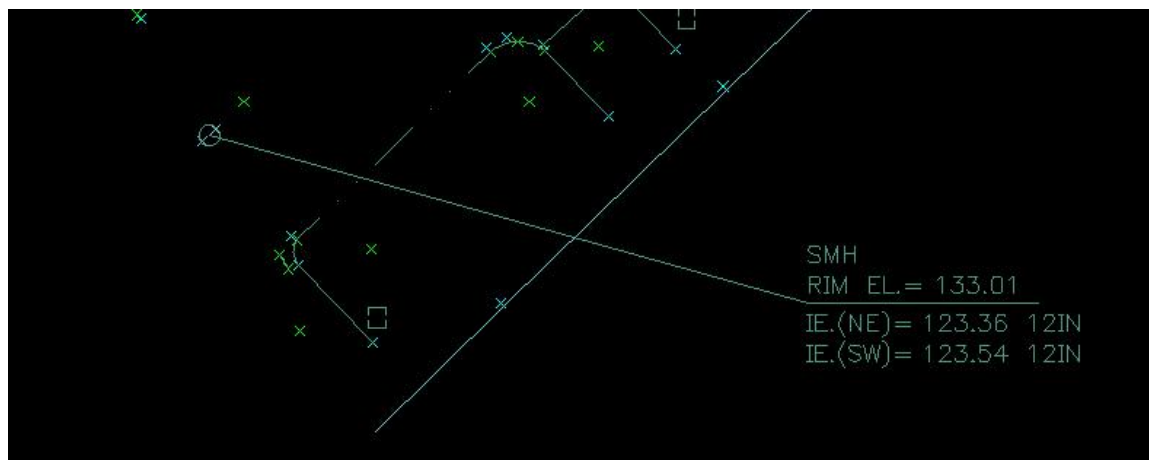
You see on this tool bar that there is a pull down menu for structures and pipes. The first thing you will want to do is select the right size of the pipe you will be putting in.

In this example we will be putting in a 10"PSS (see following picture).

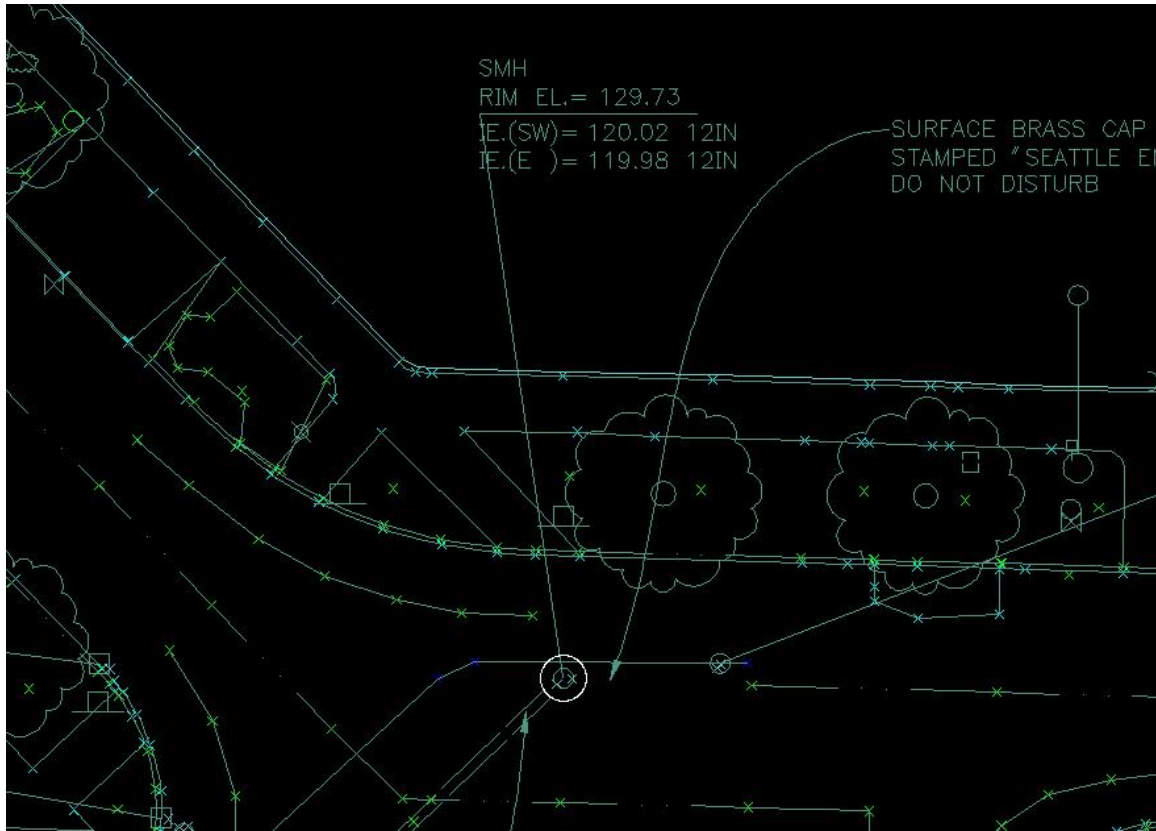


Once the right pipe size is selected the first thing it asks you is the first structure point.

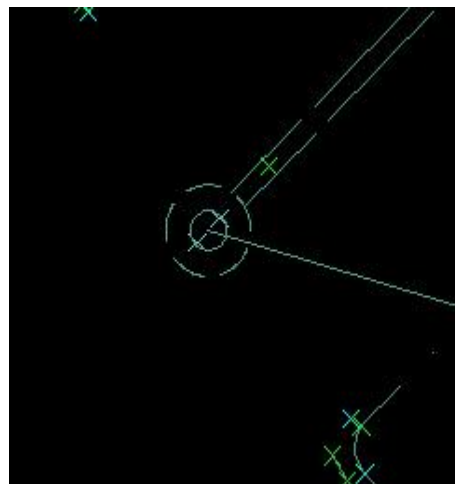
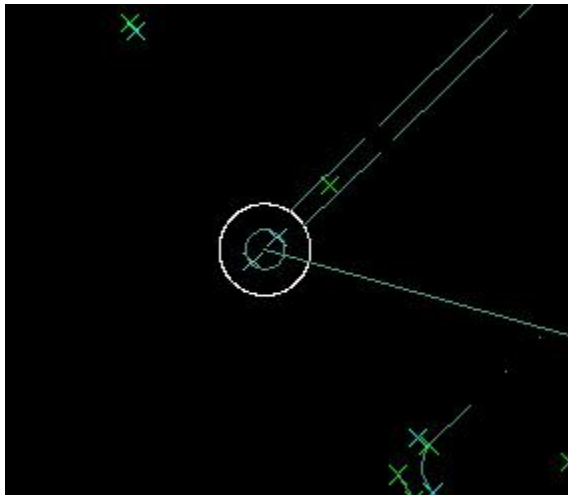
Start your pipe network on a known survey point for a manhole (see following picture).



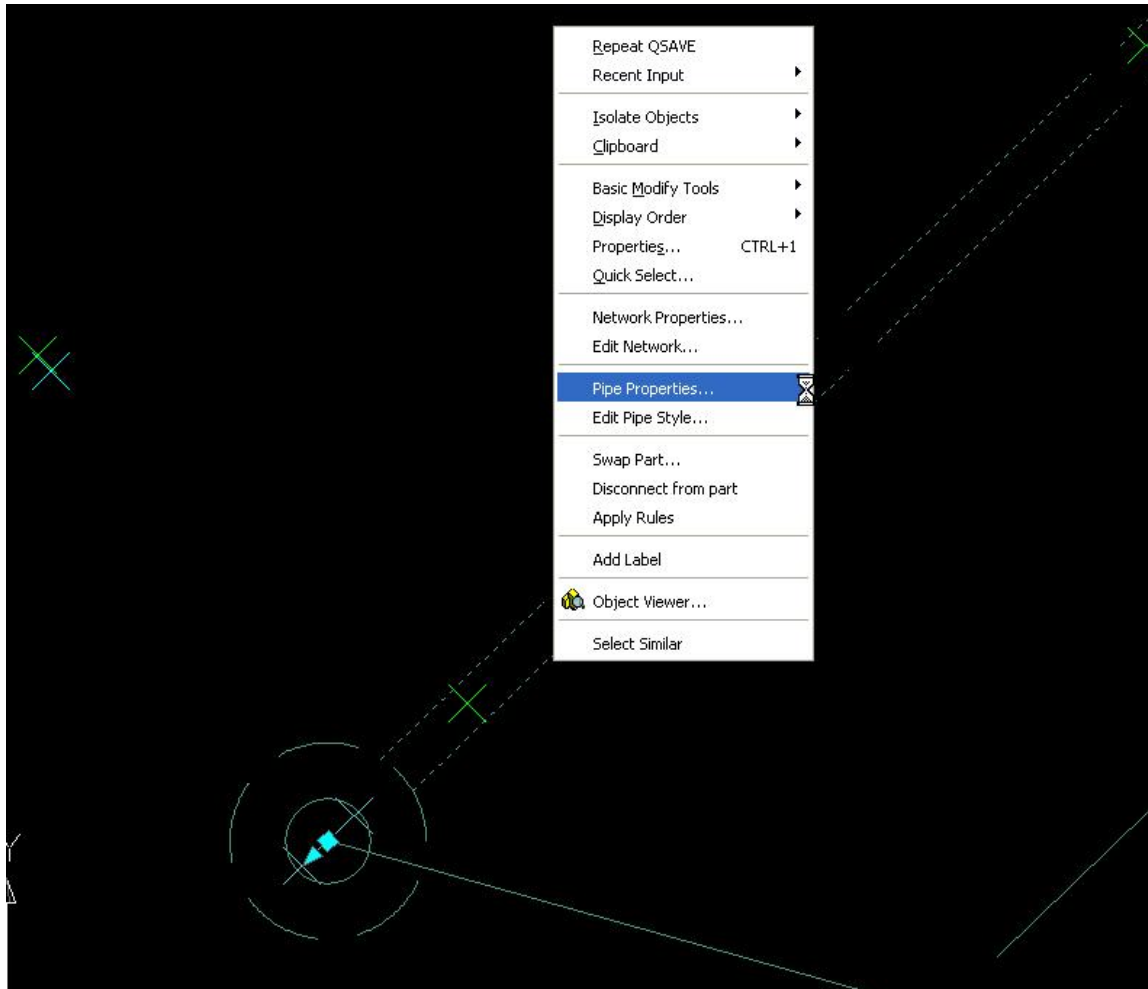
Your next point would be the next manhole survey point (see following picture).



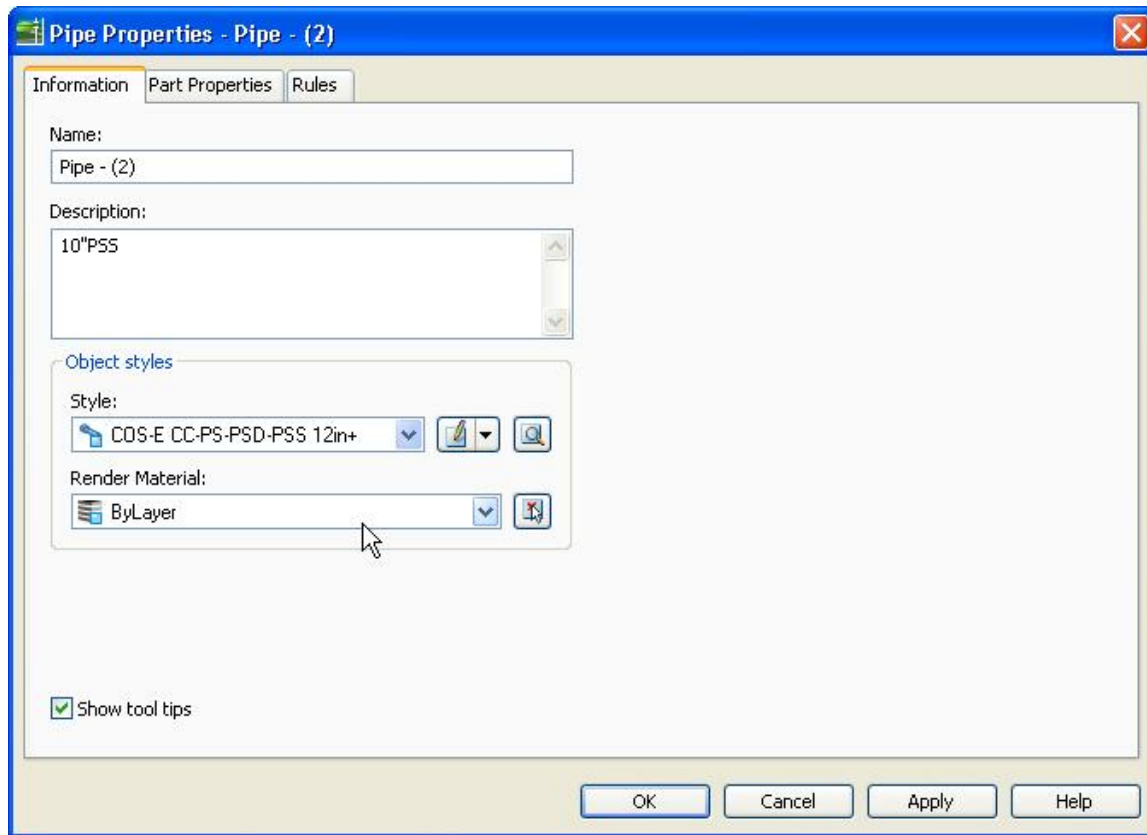
The first thing you notice is that manhole symbol doesn't look right. All it needs is to change the layer to RU-SSWR-STRC. Eventually we will have it set up so that the structure will come in at the right layer and you will not need to do this step (see following picture).



Since this pipe is a 10"PSS it needs to be shown as a single line to match our standards. To change this, click on the pipe to get the grips, right click and select pipe properties (see following picture).

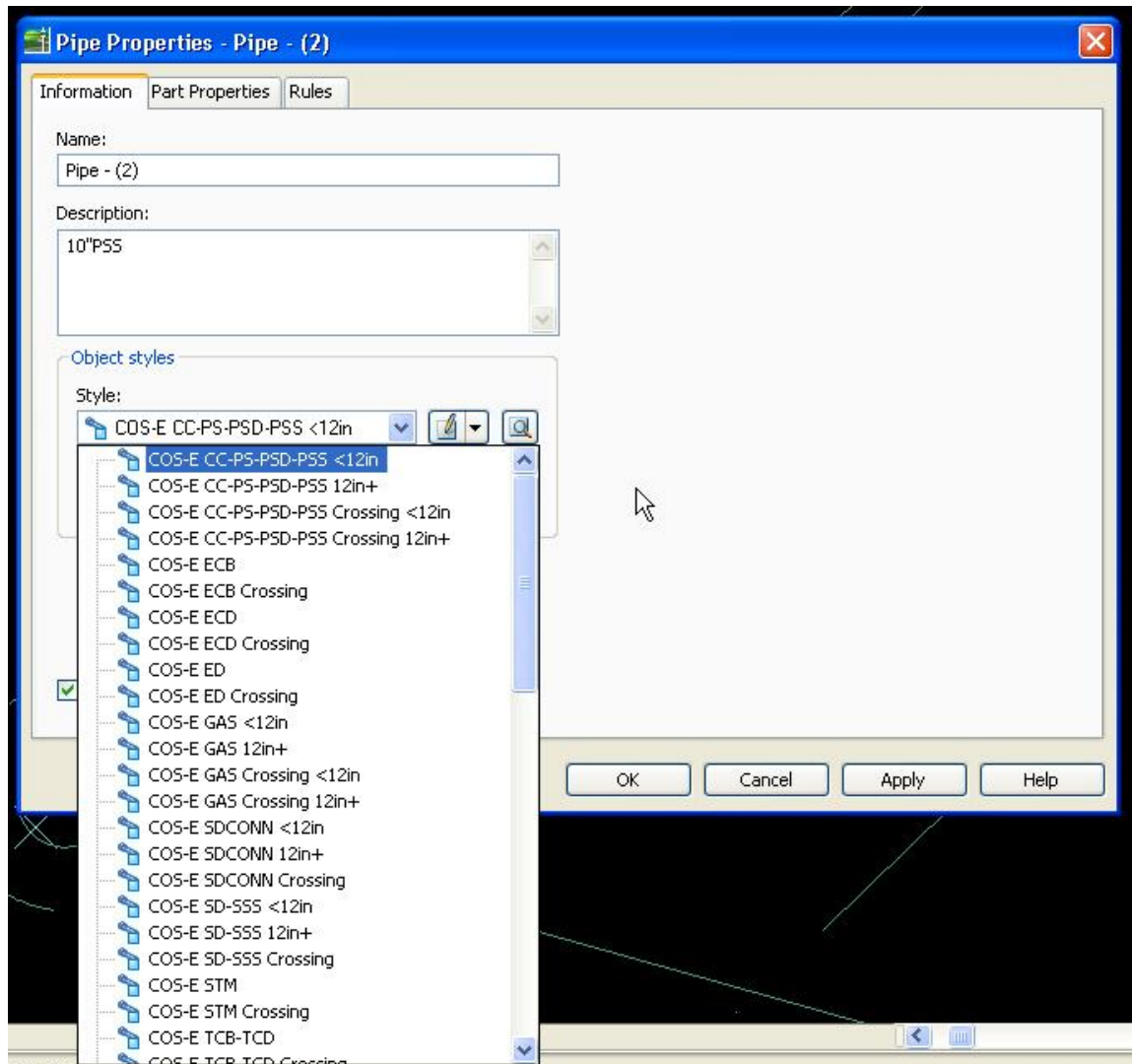


A dialog box will pop up (see following picture).

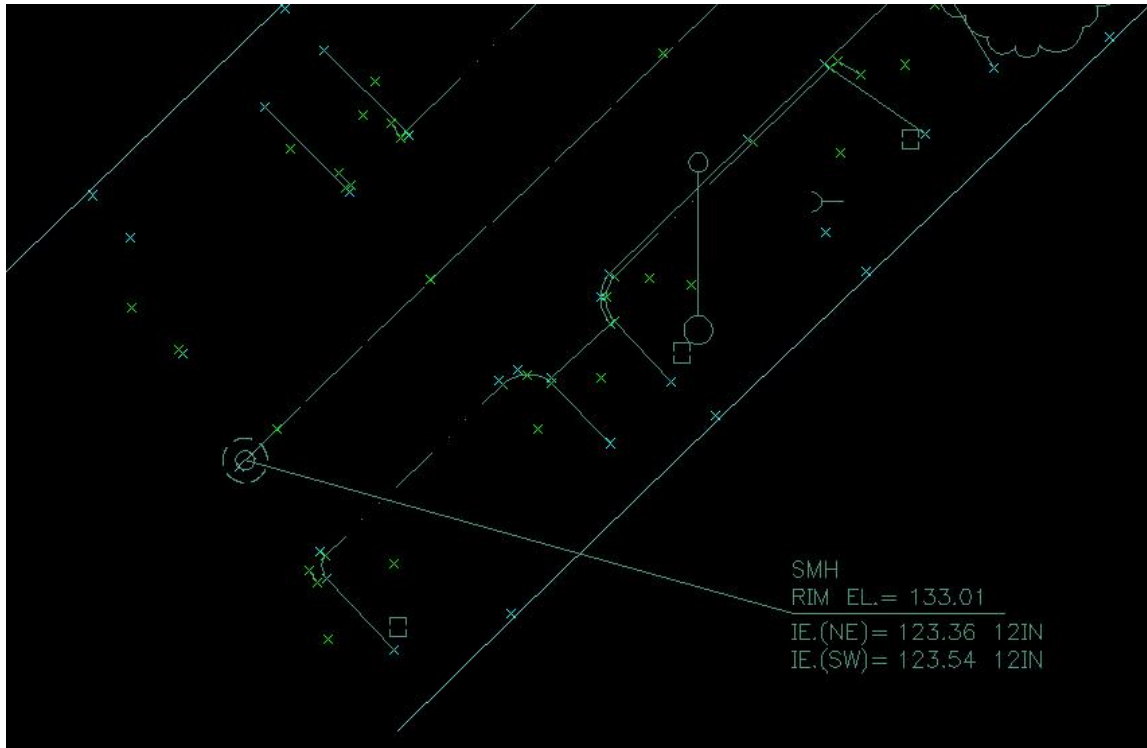


Make sure you are on the information tab.

On the style pull down menu select the COS-E C_-PS-PSD-PSS <12in style (see following picture). Click apply and then OK.

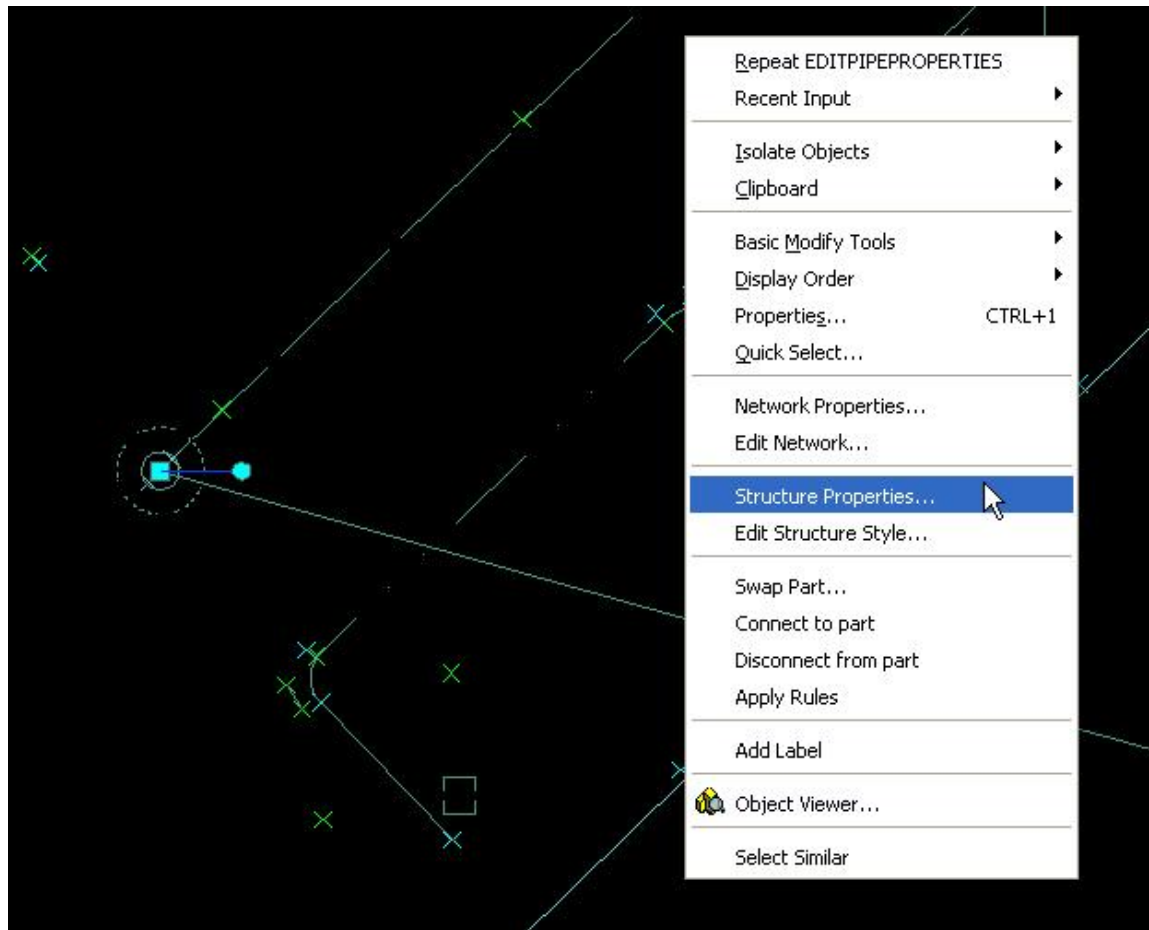


You will notice that the pipe went from a double line to a single line (see following picture).

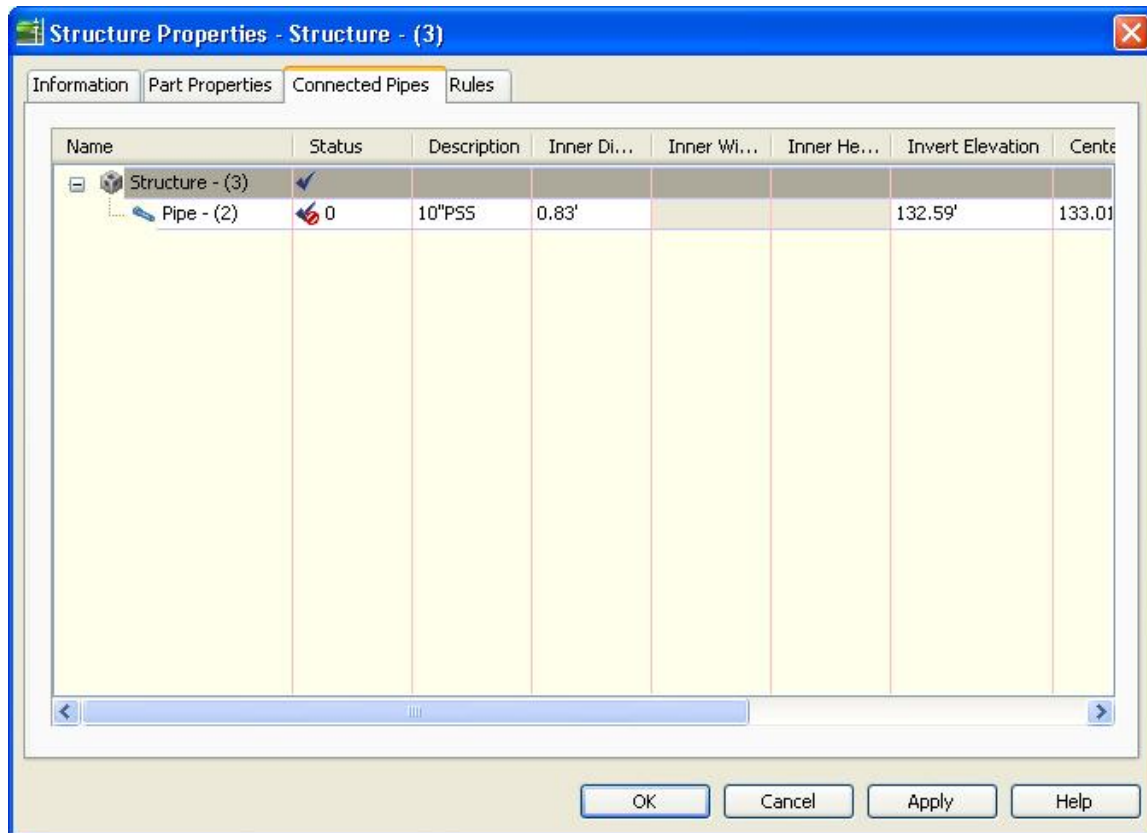


The next step would be to add the invert elevation for the pipe you just added. There are two ways of doing this. The first way is to go through the structure properties dialog box.

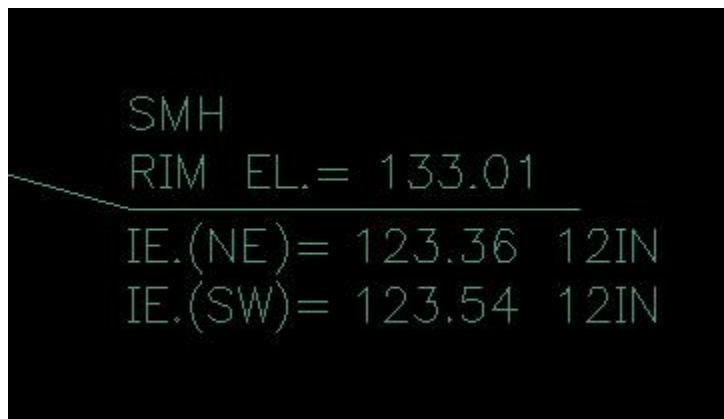
Click on the structure, right click and select structure properties (see following picture).



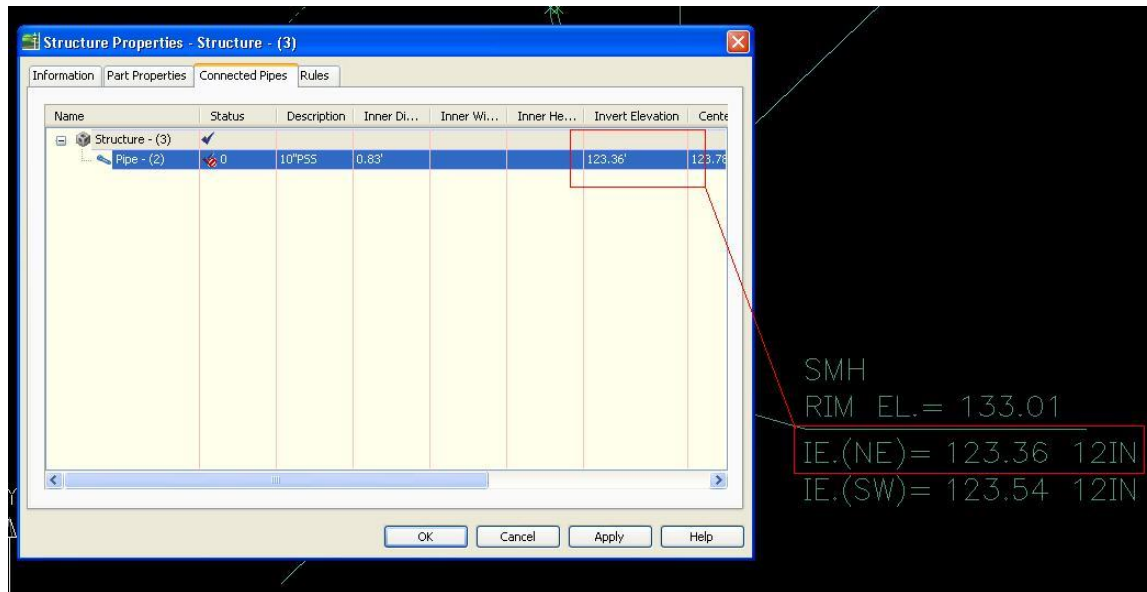
A dialog box appears. Click on the connected pipes tab (see following picture).



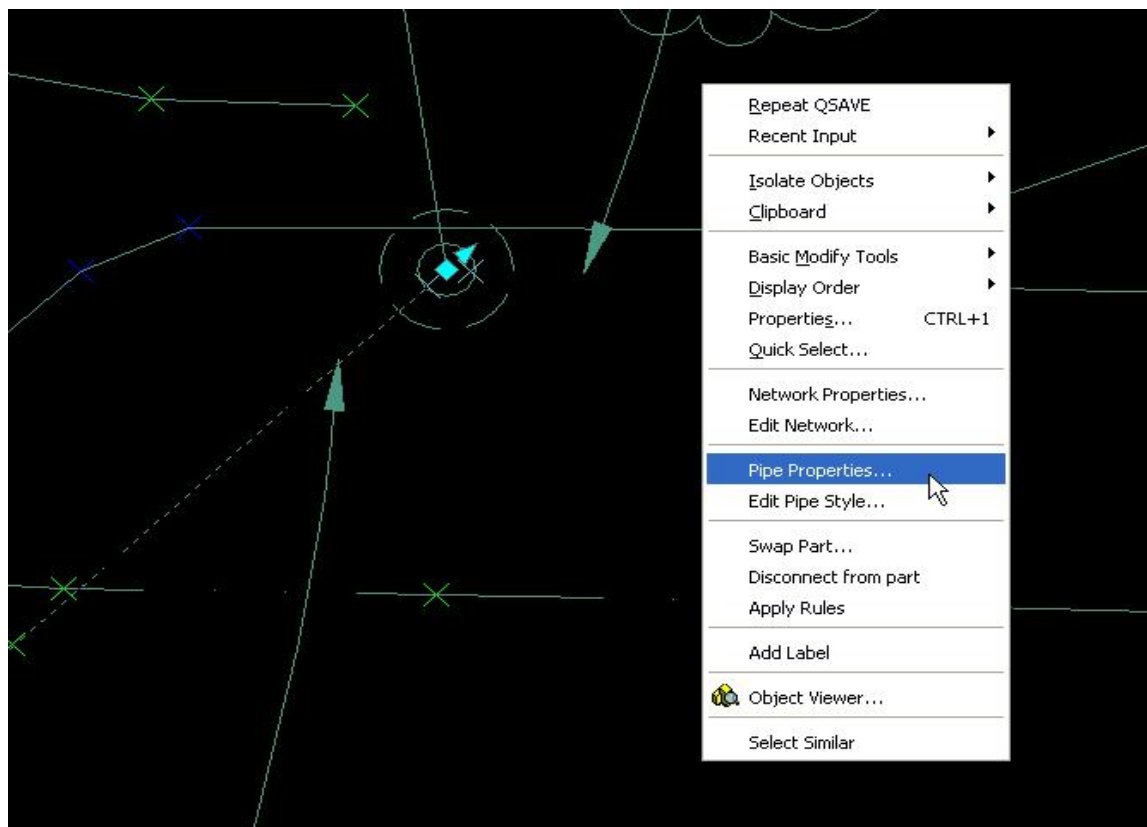
There is a column labeled Invert Elevation. It shows an invert already, but its not right. Add the right invert elevation by looking at the invert elevation block that survey provides (see following picture).



Make sure that the invert you are adding in is the right one. The invert elevation block shows the directions of each pipe that is going into that structure.



Then you would do the same thing for the other structure on that pipe. The other method of adding in the invert elevation is to go through the pipe property dialog box. Click on the pipe, right click and select pipe properties (see following picture).

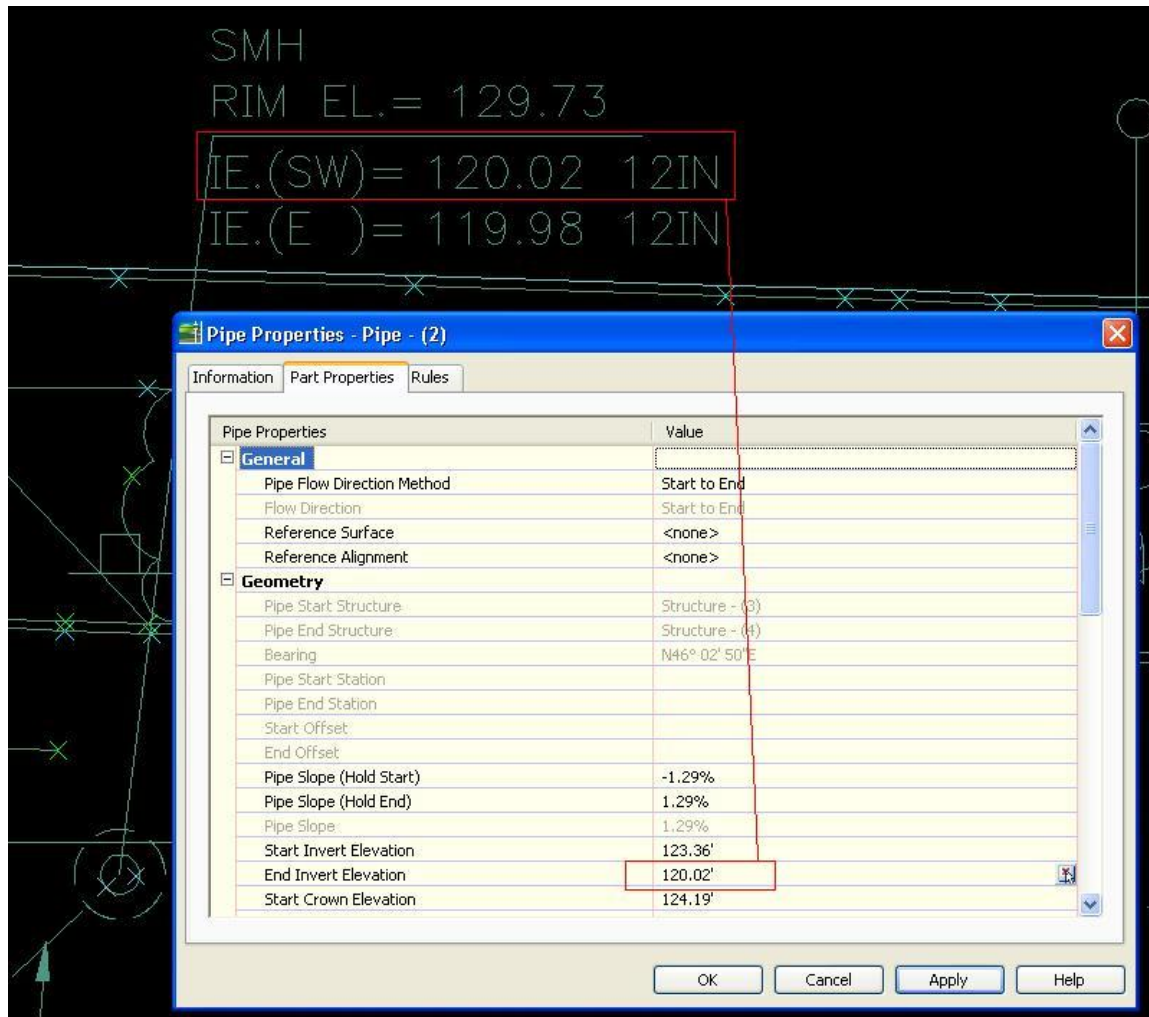


The pipe properties dialog box will appear. Click on the parts properties tab (see following picture).

Pipe Properties	Value
General	
Pipe Flow Direction Method	Start to End
Flow Direction	Start to End
Reference Surface	<none>
Reference Alignment	<none>
Geometry	
Pipe Start Structure	Structure - (3)
Pipe End Structure	Structure - (4)
Bearing	N46° 02' 50"E
Pipe Start Station	
Pipe End Station	
Start Offset	
End Offset	
Pipe Slope (Hold Start)	2.30%
Pipe Slope (Hold End)	-2.30%
Pipe Slope	-2.30%
Start Invert Elevation	123.36'
End Invert Elevation	129.31'
Start Crown Elevation	124.19'

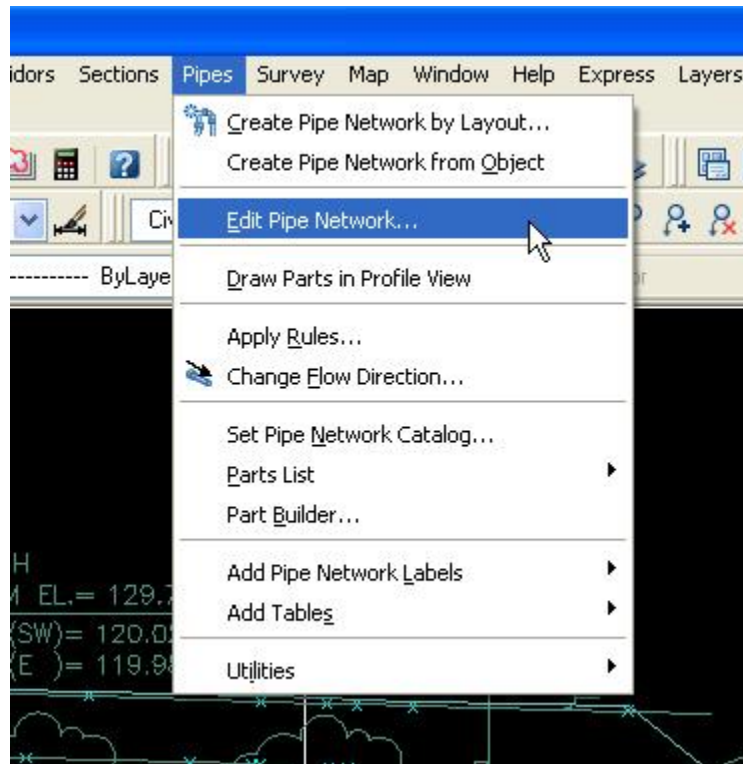
You can see that in this dialog box there are places that you can add pipe slope, pipe invert elevations, and even the crown elevation of a pipe. For right now we will just focus on the invert elevation part. To add the invert information here, you have to remember which way you drew the pipe. The first point that you clicked to begin the pipe is the start of the pipe and the second point would be the end of the pipe.

Add the invert elevations according to the invert elevation block from survey (see following picture).



So that piece of the pipe network is now finished. Now the next step is to add to this pipe network.

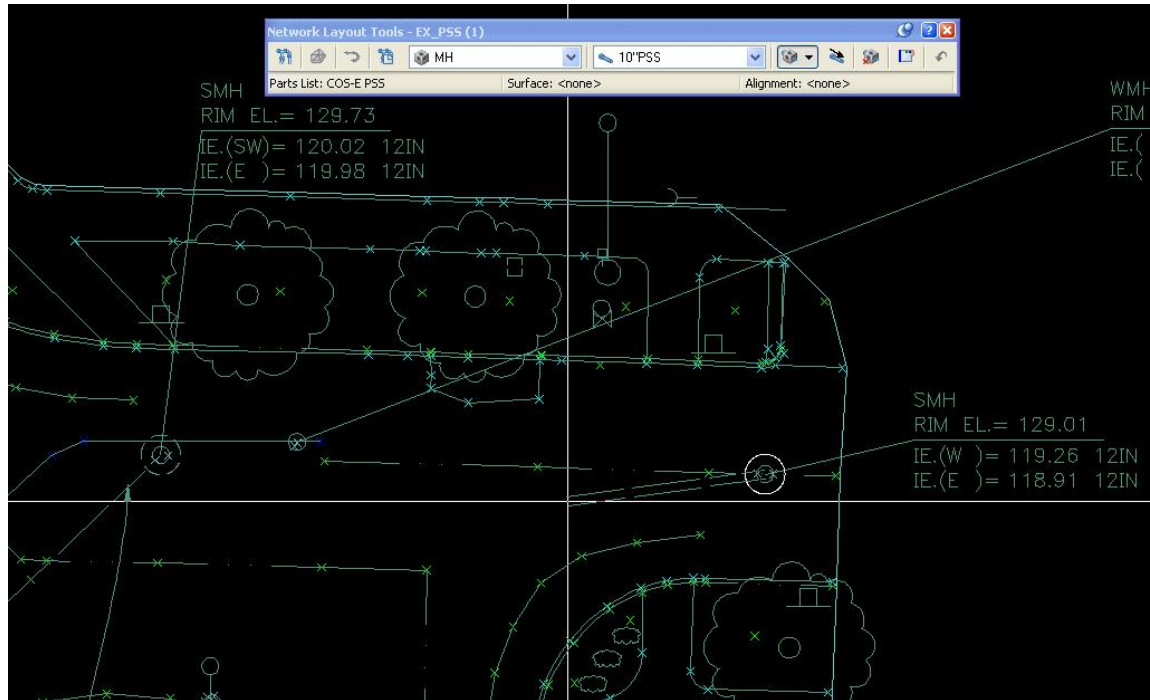
First thing you would do is go to the pipe pull down menu and select edit pipe network (see following picture).



First thing it asks you is to select a pipe from the network you want to add to. So click on the pipe you just made. The network layout tool bar pops up (see following picture).



Make sure the pipe size is the right size then pick your first point to add another structure. For this point you want to pick a point that is the next structure in line (see following picture).

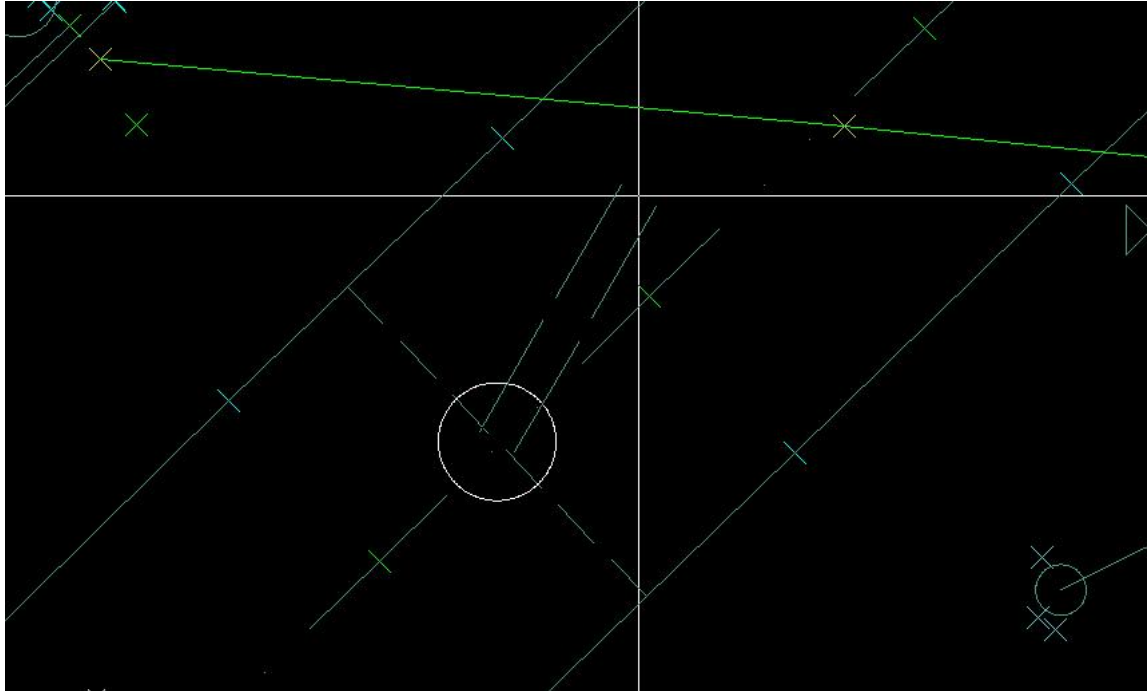


For the second point you want connect into an existing structure. When you hover your mouse over the existing structure you should see a crosshair symbol. This symbol indicates that it wants to connect into this structure (see following picture).



After the pipe is connected to the structure, it is time to add the invert elevations. Once the inverts are entered, that piece of the pipe network is complete.

Now there will come a point where there is only one manhole to connect to and the other manhole is not in the surveyed area. Usually in a base map, we would show a tilde if it's a single line and a pipe end if it's a double line. I will show you how we do this in pipes. First we start off by going to the pipes pull down menu and selecting edit pipe network. Select a piece of pipe of the network you want to add to. For your first point you want to pick a point where the pipe runs. This is the point that has no manhole (see following picture).

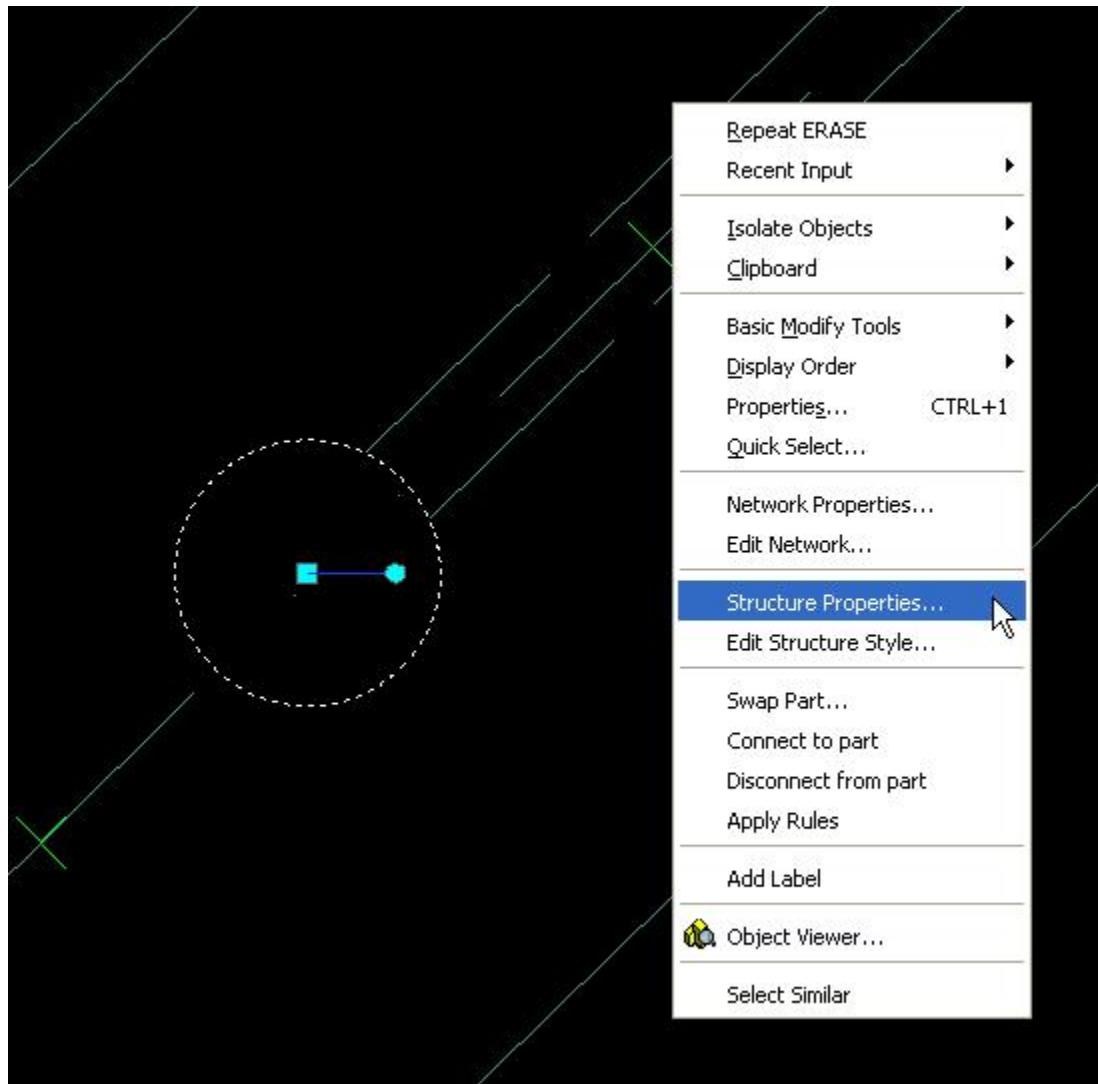


Your next point would be to connect into the structure that the pipe is connected to (see following picture).

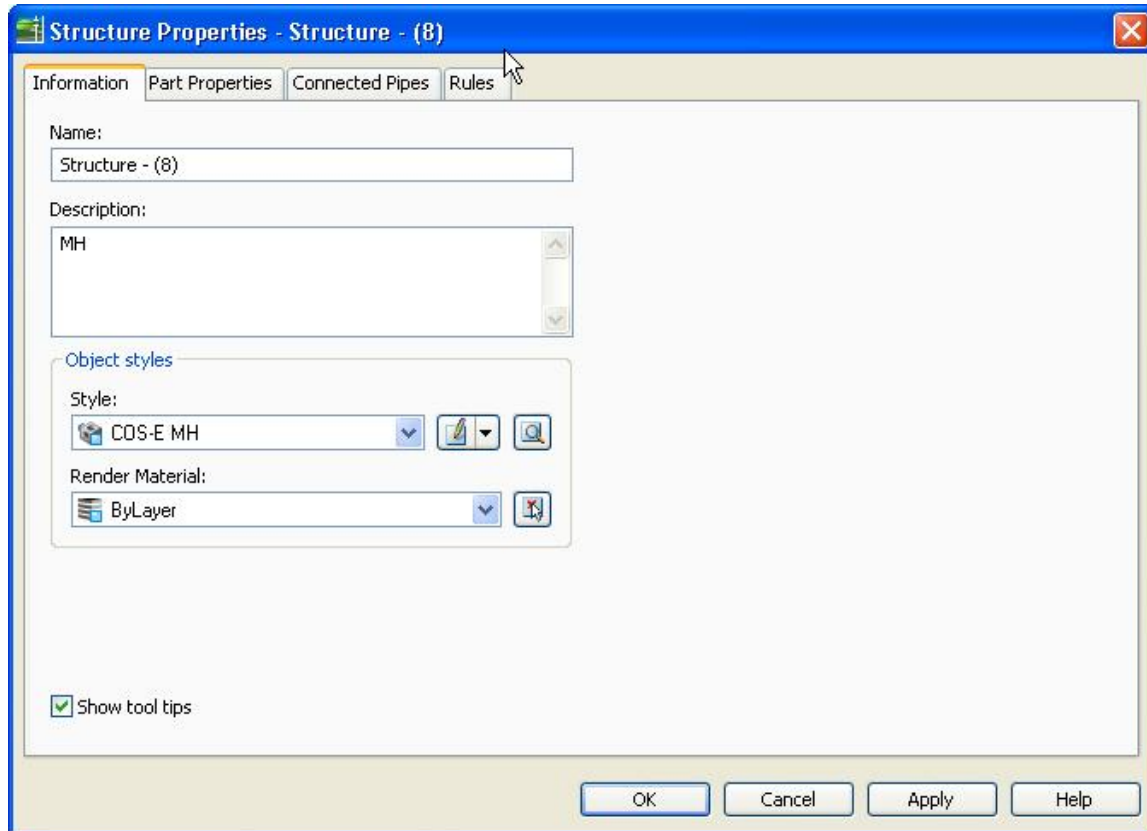


Make sure you see the crosshair symbol. Once that's connected, you want to go back to your first point and change the structure style to get the pipe end symbol.

Click on the structure, then right click and select structure properties (see following picture).

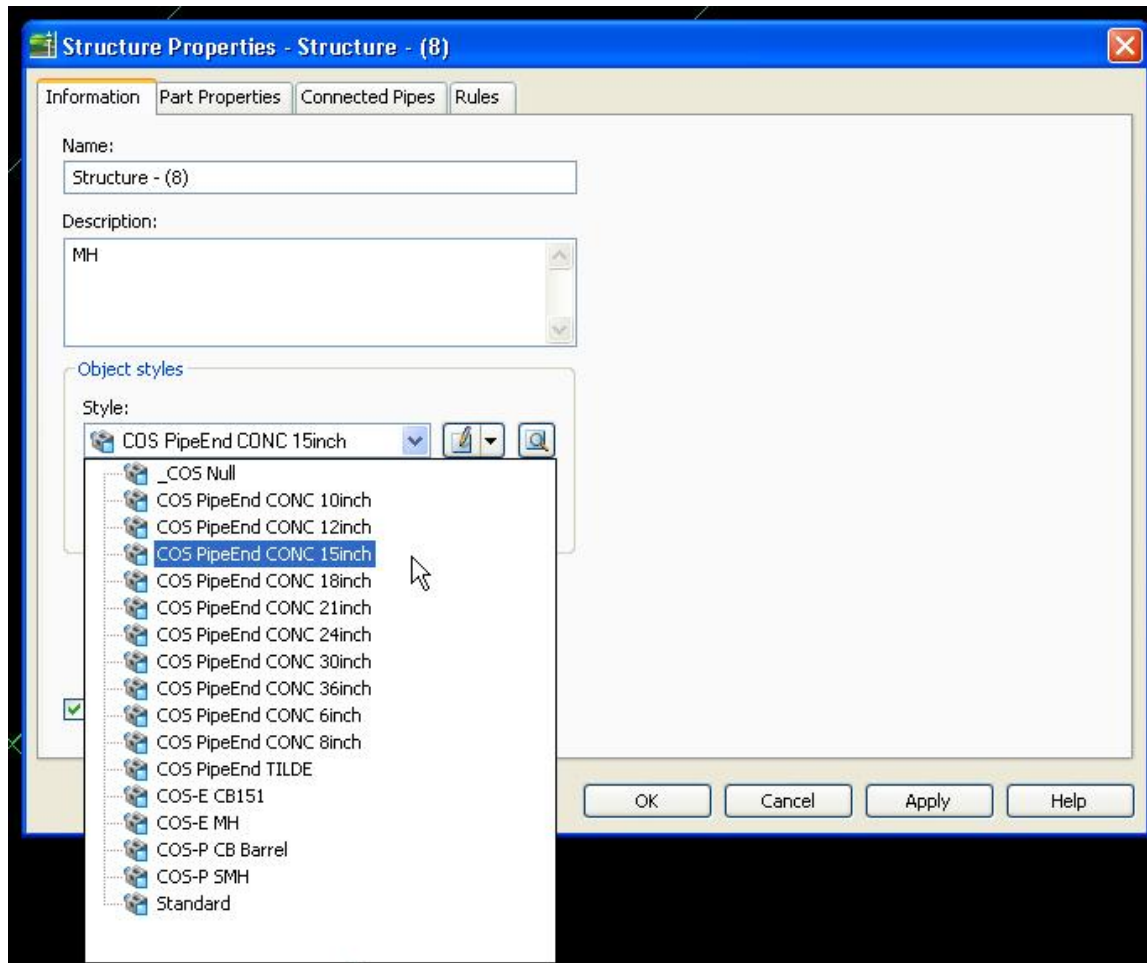


The structure properties dialog box will appear. Make sure its on the information tab (see following picture).

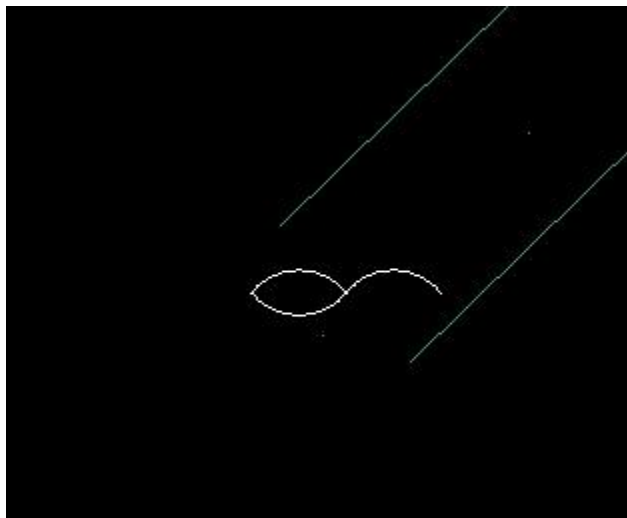


Click on the style pull down menu and select the pipe end style that fits the size of pipe you put in.

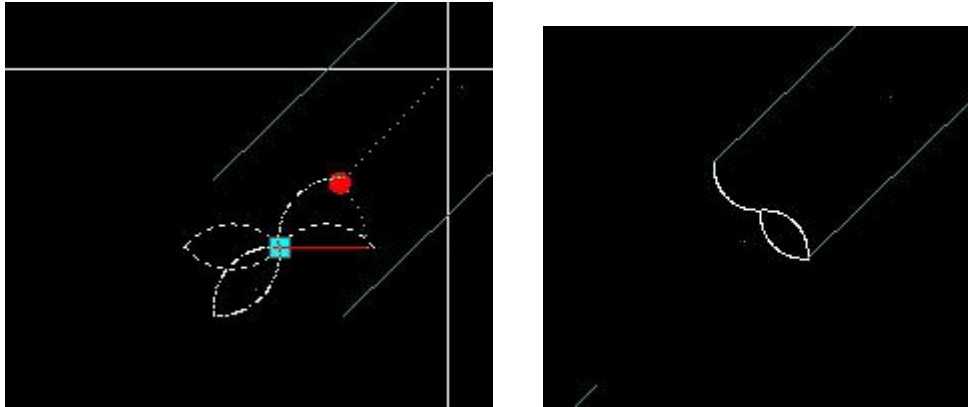
For this example we will be selecting the COS PipeEnd CONC 15inch (see following picture).



Click apply and then OK. On the screen will be a pipe end for the 15”PSS (see following picture).



The next step would be to rotate the pipe end to make it look right. Click on the pipe end to show the grips, grab the circular grip, and snap to the end point of the pipe (see following pictures).



Change layer of the pipe end to the pipe layer. Next thing is to add the invert elevations for this pipe. Start with the end that is attached to a manhole. Add the invert elevation that is shown on the invert block (see following picture).



Next would be to add the elevation for the other end. Since there is a pipe end symbol at that end of the pipe, that indicates that the pipe continues somewhere off the paper. This is not a set end point, so there is no invert elevation. There are a couple of different ways to determine the elevation at that point. The first way would be to find the as-built plan that put that pipe in and use the slope that they give you.

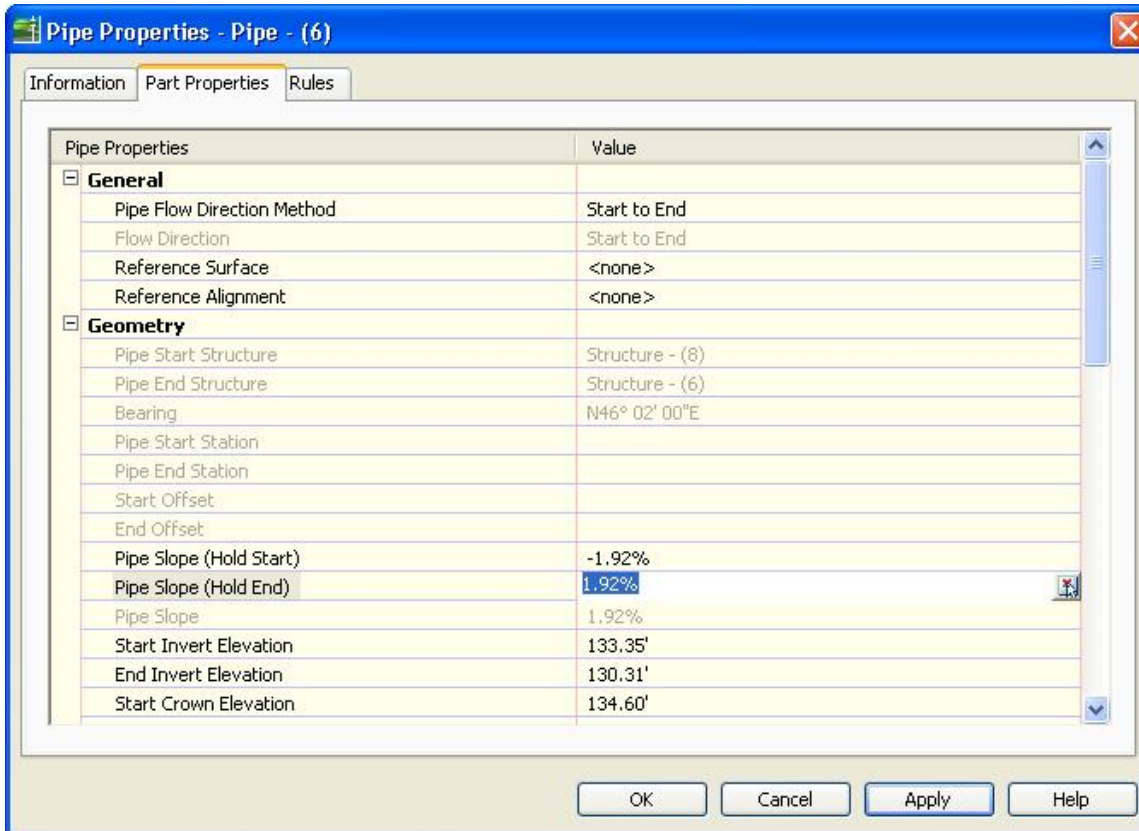
Now that you have the slope, you want to add it into the pipe properties (see following picture).

Pipe Properties	Value
General	
Pipe Flow Direction Method	Start to End
Flow Direction	Start to End
Reference Surface	<none>
Reference Alignment	<none>
Geometry	
Pipe Start Structure	Structure - (8)
Pipe End Structure	Structure - (6)
Bearing	N46° 02' 00"E
Pipe Start Station	
Pipe End Station	
Start Offset	
End Offset	
Pipe Slope (Hold Start)	-1.80%
Pipe Slope (Hold End)	1.80%
Pipe Slope	1.80%
Start Invert Elevation	133.16'
End Invert Elevation	130.31'
Start Crown Elevation	134.41'

Buttons: OK, Cancel, Apply, Help

In this dialog box it shows pipe slope (hold start) and pipe slope (hold end). Where you started your pipe is the start point and where you ended your pipe is the end point. If you have a pipe with the little pipe end symbol usually you would start that pipe with that point and end it at the manhole. If that is the case, you will want to add the slope to pipe slope (hold end). The reason for this is because you have an invert elevation on that end point. So you want to hold that point and then add the slope to the pipe.

For this pipe the slope is 1.92% (see following picture).



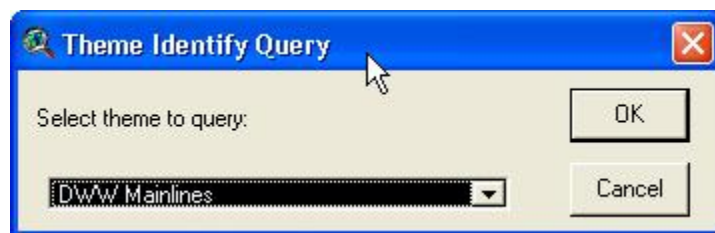
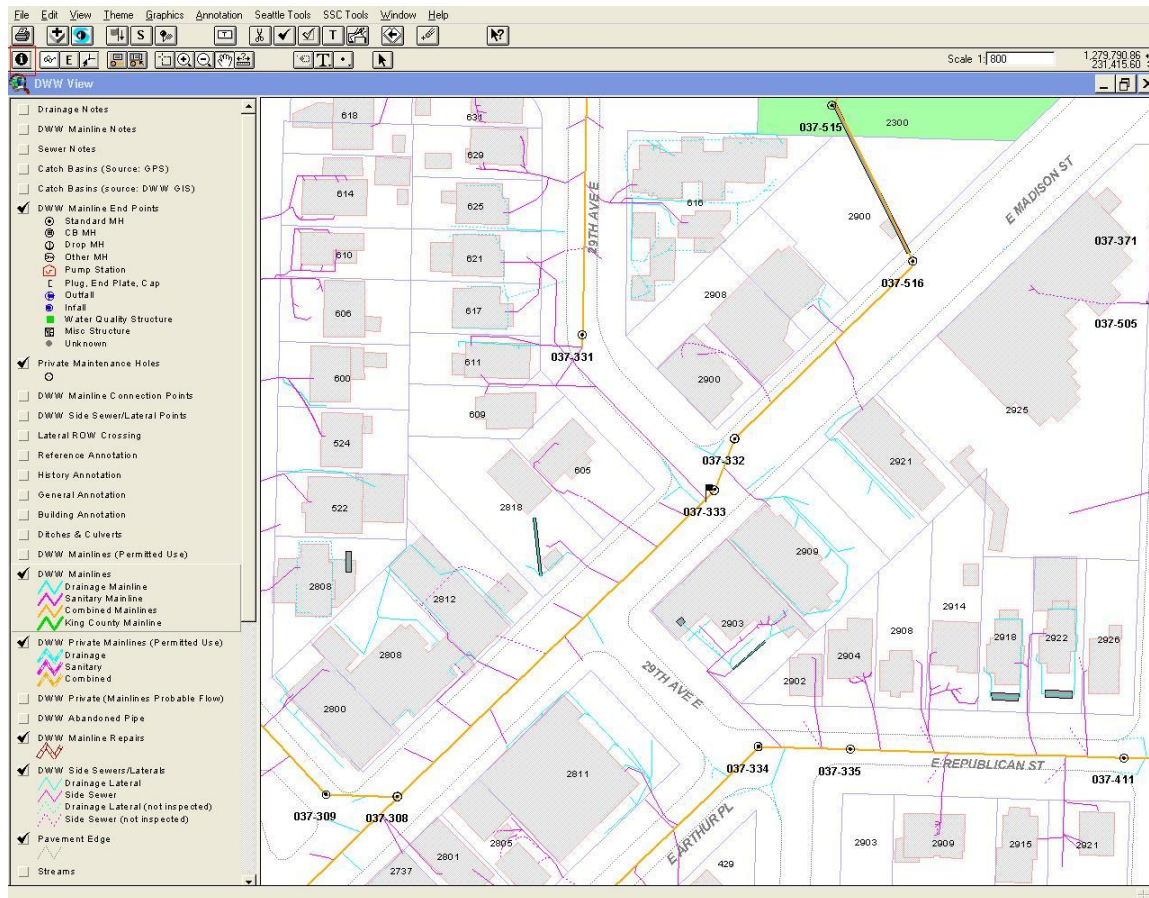
Pipe Properties	Value
General	
Pipe Flow Direction Method	Start to End
Flow Direction	Start to End
Reference Surface	<none>
Reference Alignment	<none>
Geometry	
Pipe Start Structure	Structure - (8)
Pipe End Structure	Structure - (6)
Bearing	N46° 02' 00"E
Pipe Start Station	
Pipe End Station	
Start Offset	
End Offset	
Pipe Slope (Hold Start)	-1.92%
Pipe Slope (Hold End)	1.92%
Pipe Slope	1.92%
Start Invert Elevation	133.35'
End Invert Elevation	130.31'
Start Crown Elevation	134.60'

If the slope is higher than the invert that is given, then you would put in the slope as shown above. If the slope is lower than the invert you have, then you would type in a negative before the number.

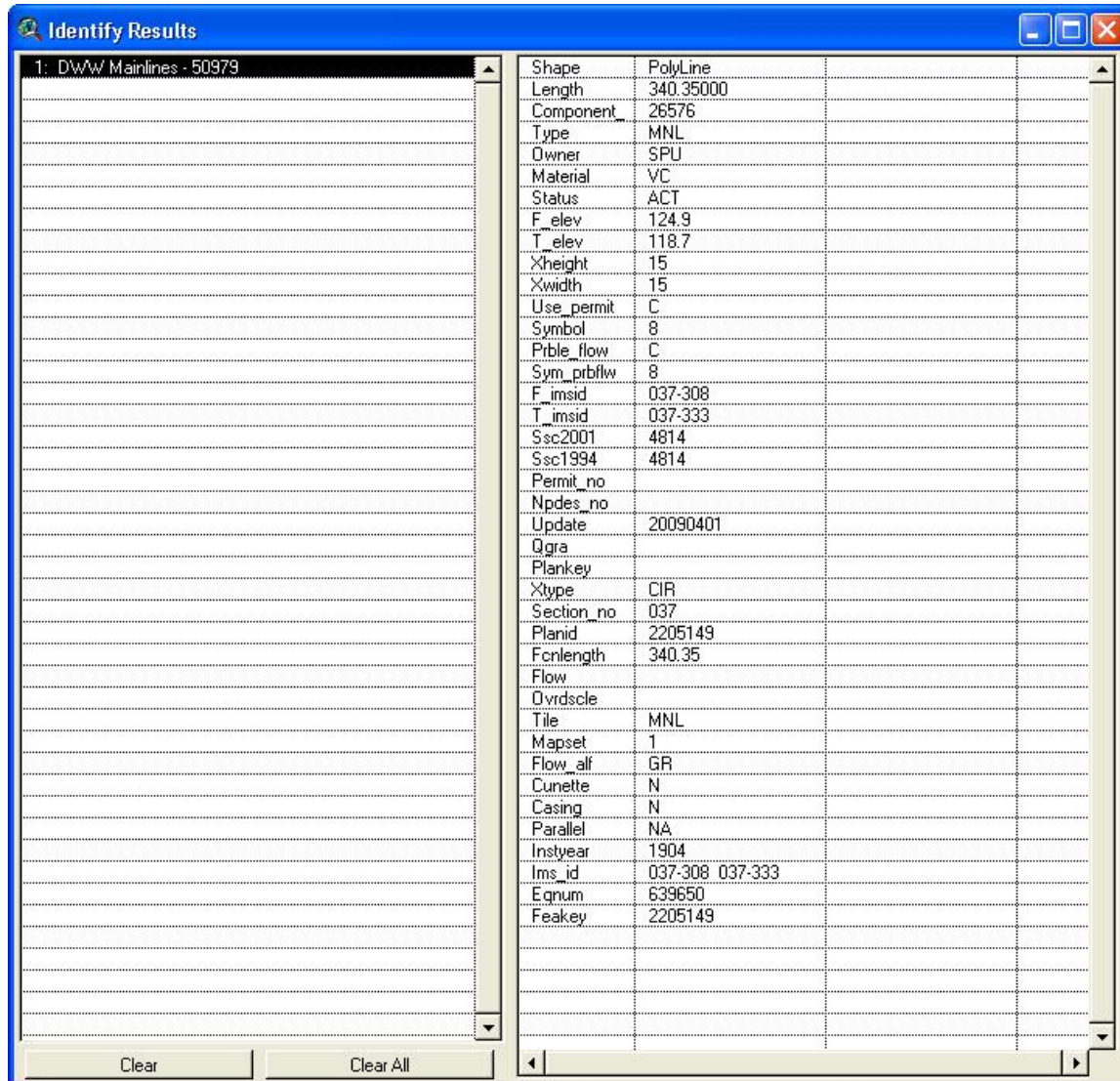
The second way to get a slope is to use GIS. Open up ArcView DWU M & O – Network (see following picture).



Go to your area where your pipe is located. Click on the identify button and select DWW Mainlines (see following pictures).



Click on the pipe that you need to identify. A box pops up with tons of info about this pipe (see following picture).



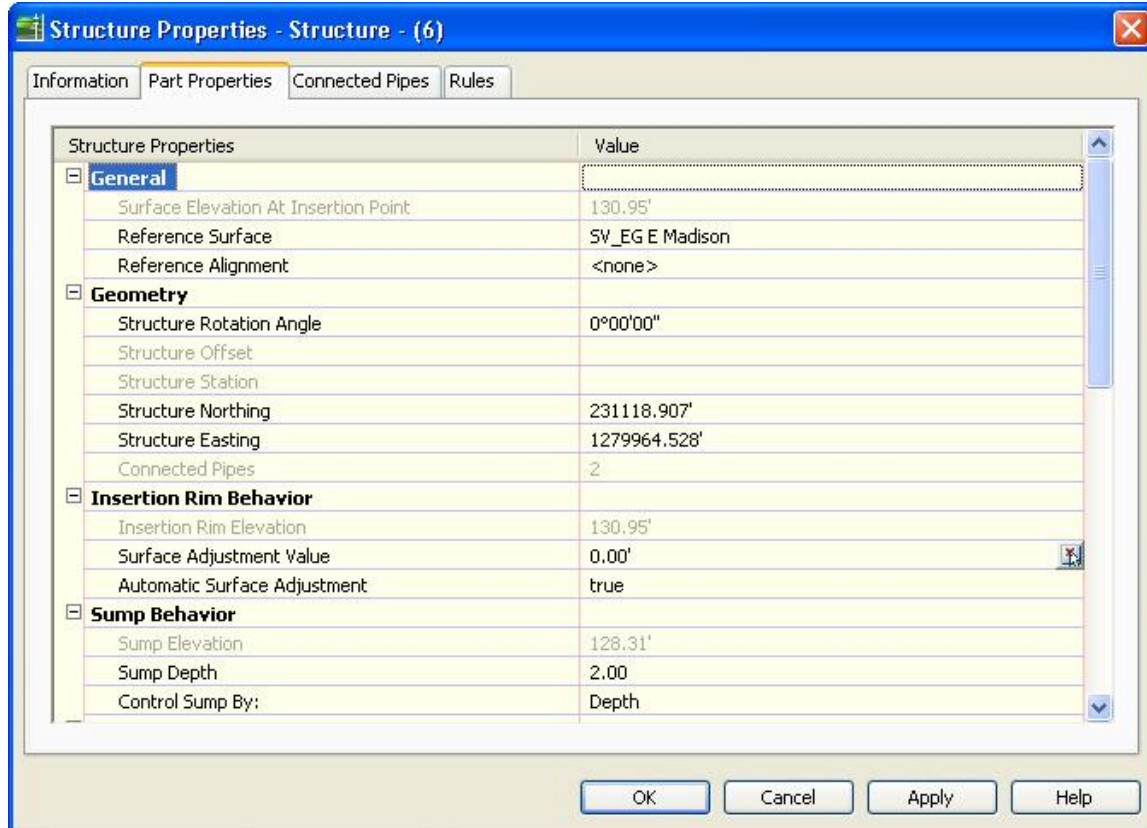
Now to get the slope, you just need to do some simple math. For this piece of pipe you would take the F_elev and subtract the T_elev. Then you take that answer and divide it by the length. So the math looks like this:

$$124.9 - 118.7 = 6.2 \quad 6.2 / 340.35 = .0182. \text{ So the slope would be } 1.82\%.$$

This number is not going to match the slope that you would get from an as-built plan, but it will be close. I would use the as-built plan first and if you can't find a slope on the plan, then go to GIS.

Changing the Rim Elevation

Since survey doesn't incorporate the rim elevations into the surface, you will need to change the rim elevation to the one shown on the survey block. The way to do this is by clicking on the structure and right clicking and selecting structure properties (see following picture).



Click on the Part Properties tab. Under Insertion Rim Behavior, it shows the insertion rim elevation as 130.95'. Noticed that its grayed out and you can't change it. So if the survey block shows that the rim elevation is 131.52, you have to adjust the elevation to the right height.

Below Insertion Rim Elevation there is a line called Surface Adjustment Value. Here you will type in the difference between the two elevations (see following picture).

Structure Properties	Value
General	
Surface Elevation At Insertion Point	130.95'
Reference Surface	SV_EG E Madison
Reference Alignment	<none>
Geometry	
Structure Rotation Angle	0°00'00"
Structure Offset	
Structure Station	
Structure Northing	231118.907'
Structure Easting	1279964.528'
Connected Pipes	2
Insertion Rim Behavior	
Insertion Rim Elevation	131.52'
Surface Adjustment Value	0.57'
Automatic Surface Adjustment	true
Sump Behavior	
Sump Elevation	128.31'
Sump Depth	2.00
Control Sump By:	Depth

If there is a problem with the surface adjustment value and the number isn't working right, check to make sure that there is a surface in the drawing and that the pipe networks are referencing these surfaces.


Appendix 6: Working With Sheet Set Manager

Introduction

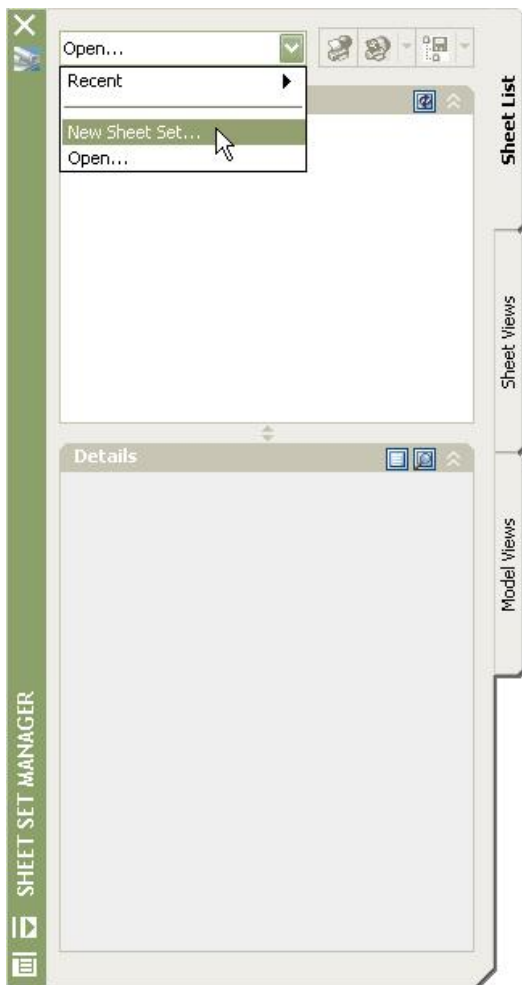
Sheet Set Manager (SSM) is a powerful tool included with AutoCAD 2007/2008. SPU & SDOT use SSM to ensure consistency in every sheet as required by our CADD standards.

Creating a New Sheet Set

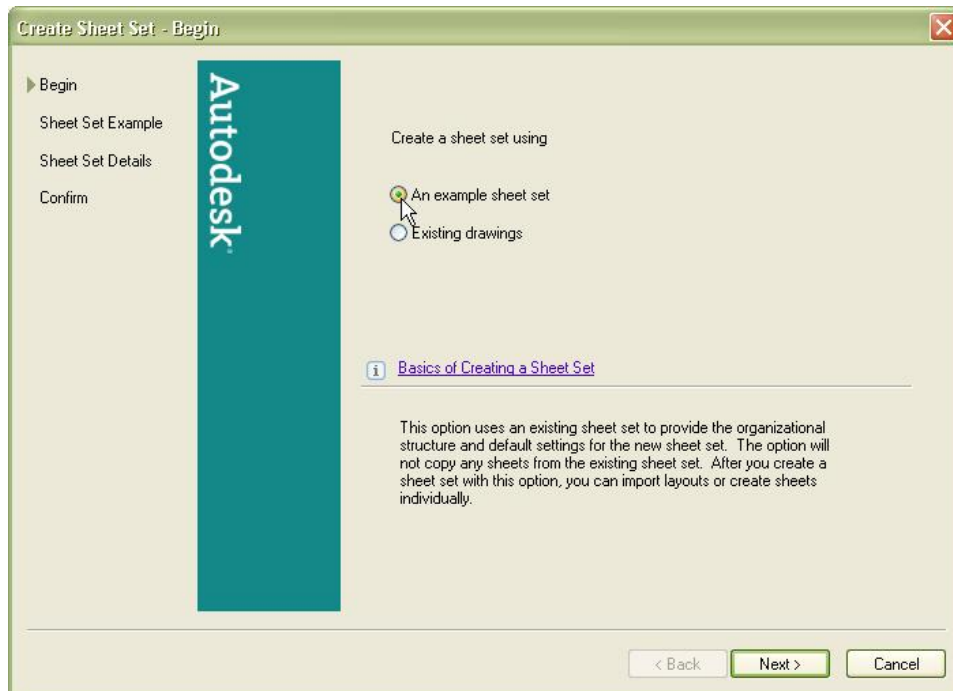
Start up Sheet Set Manager one of the following ways:

- Click on this button: 
- Type SSM in the command line.
- Ctrl+4
- Select the pull-down menu: Tools → Palettes → Sheet Set Manager

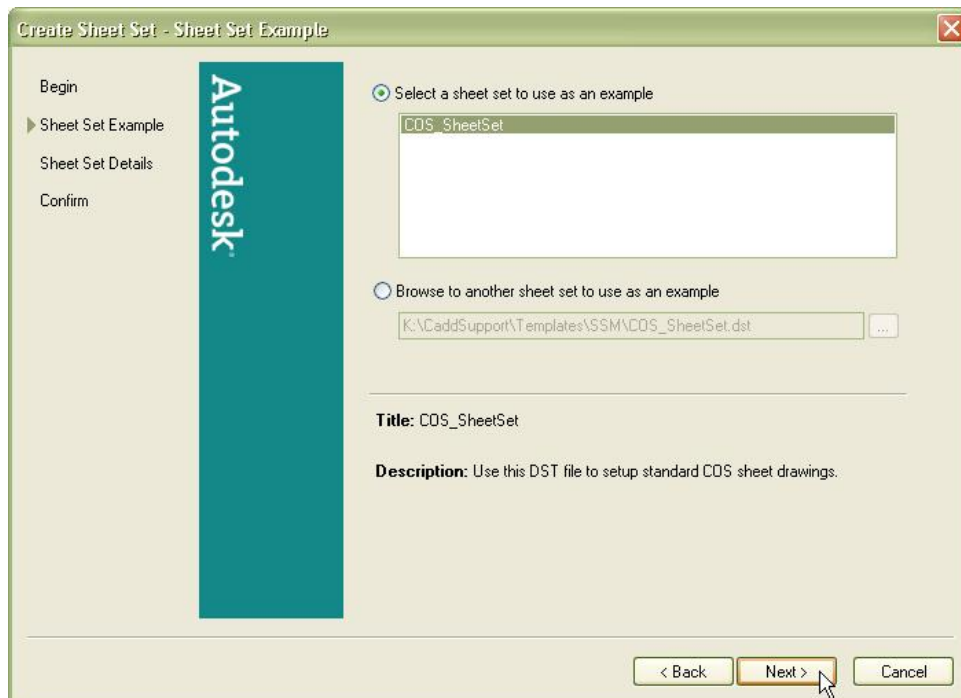
Create a new sheet set by selecting the down-arrow in Sheet Set Manager and selecting “New Sheet Set...” (see following picture).



Create a new sheet set using an example sheet set (see following picture).



Click “Next >”. Select a sheet set to use as an example (see following picture). The COS_SheetSet should be the only option if you set your template paths correctly using the instructions on the first page.



Click “Next >”.

Fill out the form with your project name, description and the sheet set storage location (see following picture).

Autodesk

Create Sheet Set - Sheet Set Details

Begin
Sheet Set Example
► Sheet Set Details
Confirm

Name of new sheet set:
C302404_Sample

Description (optional):
Sample drawing set showing standard CDS sheet drawings.

Store sheet set data file (.dst) here:
K:\CaddSupport\Sample Drawings\Plot_Files

Note: The sheet set data file should be stored in a location that can be accessed by all contributors to the sheet set.

☐ Create a folder hierarchy based on subsets

Sheet Set Properties

< Back Next > Cancel

Click the “Sheet Set Properties” button to add more information about your project to the sheet set (see following picture).

Sheet Set Properties - C302404_Sample

Sheet Set	
Name	C302404_Sample
Sheet set data file	K:\CaddSupport\Sample Drawings\Plot_Files\C302404_Sample.dst (v1.1)
Description	Sample drawing set showing standard COS sheet drawings.
Model view	
Label block for views	(K:\CaddSupport\Blocks\P-Common\SSM\View_Label.dwg)
Callout blocks	(K:\CaddSupport\Blocks\P-Common\SSM\Callout.dwg);(K:\CaddSupport\Blocks\P-Common\SSM\Callout.dwg)
Page setup overrides file	K:\CaddSupport\Templates\SSM\COS_SheetSet.dwt

Project Control	
Project number	C302404
Project name	27TH AVE S/S FOREST ST SEWER & WATER REHABILITATION
Project phase	
Project milestone	100%

Sheet Custom Properties	
Design Checker Initials	
Designer Initials	
Drafter Initials	
Drawing Checker Initials	
PE Seal Expiration Date	mm/dd/yyyy
PE Seal Registration Number	#
Received	
Reviewed by Const	
Reviewed by Des	
Reviewed by Proj Mgr	
Reviewed by SDOT	
Revised As-Built	
Scale	H. 1"=20', V. 1"=10'
Sheet Custom Title	

Sheet Creation	
Sheet storage location	K:\CaddSupport\Sample Drawings\Plot_Files
Sheet creation template	Plot(K:\CaddSupport\Templates\SSM\COS_SheetSet.dwt)
Prompt for template	No

Sheet Set Custom Properties	
Job Number - CO	
Job Number - PC	C302404
Job Number - R/W	
Project Title	27TH AVE S/S FOREST ST SEWER & WATER REHABILITATION
Total Number of Sheets	4
Vault Plan Number	123-456
Vault Serial Number	123456

Sheet Set Custom Properties

Edit Custom Properties... OK Cancel Help

Explanation of Sheet Set Properties:

Sheet Set (skip)

This section will be filled in for you already. You can skip this section.

Project Control (if applicable)

Fill in the project number, name, phase and milestone (if applicable). The milestone field will be displayed on the lower left corner of every title block in the sheet set. For example, when your project is approaching the 60% design milestone, in the milestone field type 60% DRAWINGS. Every sheet will display this label.

Sheet Custom Properties (skip for now; add to individual sheets)

This contains the *default settings* for creating new sheets, but will not change settings for existing sheets. For example, if there will be only one drafter for every sheet in the project, fill in the drafter's initials in the appropriate field and every sheet that is created from that point on will contain those initials by default. If you are not sure what changes will be made in the future, leave this section as-is. You can change these properties on a sheet-by-sheet basis in the future.

Sheet Creation (skip)

This section will be filled in for you already. You can skip this section.

Sheet Set Custom Properties (project information)

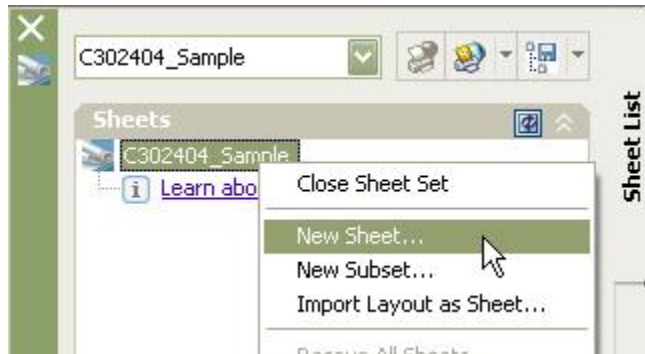
This section contains the global settings for your entire sheet set. You should fill in most of the fields in this section. The data in these fields will show up on all the title blocks in this sheet set.

Click OK when you are done.

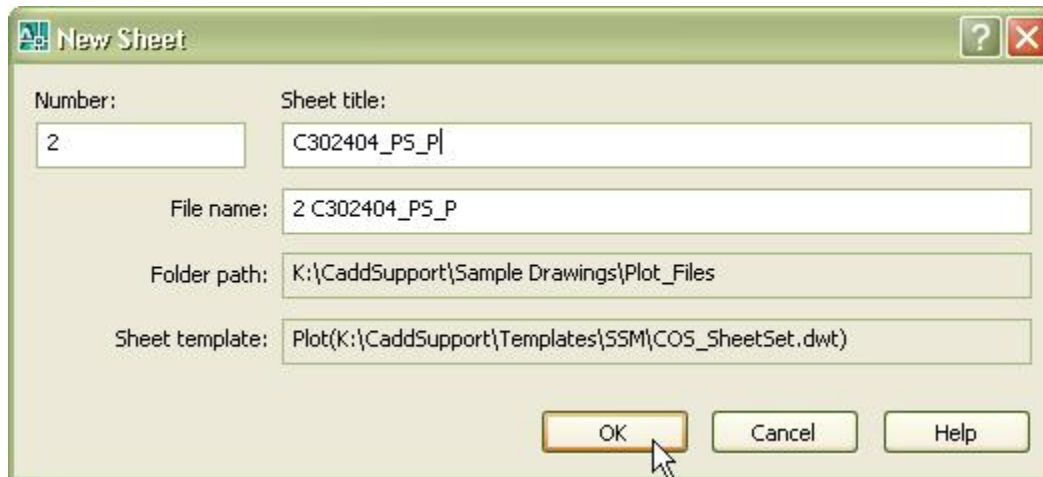
Click "Next >" and you will see a summary of the sheet set you just created. Click Finish.

Creating Sheets

Right-click on the sheet set and select “New Sheet...” (see following picture).

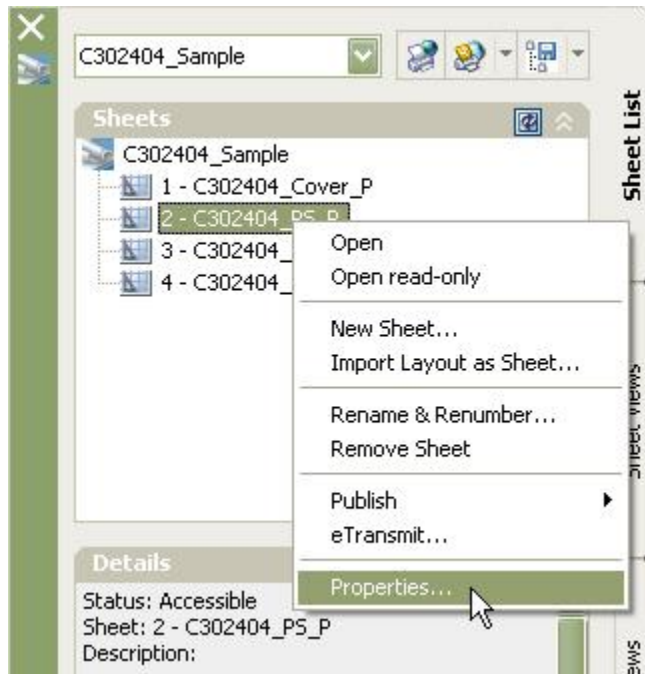


Fill in the “Number” and “Sheet title” boxes. The “File Name” box will automatically be filled in for you. The “Sheet title” should follow the standard file naming convention (see following pictures).



NOTE: See CAD Manual for standard file naming convention.

Your new sheet will now appear under the sheet set. Right-click on the new sheet and select “Properties...” (see following picture).



Scroll down in the resulting dialog box and edit the section called “Sheet Custom Properties” (see following picture).

Sheet Custom Properties	
Design Checker Initials	
Designer Initials	
Drafter Initials	
Drawing Checker Initials	
Line 1: Sheet Custom Title	
Line 2: Sheet Custom Title	
Line 3: Sheet Custom Title	SEWER PLAN & PROFILE
PE Seal Expiration Date	mm/dd/yyyy
PE Seal Registration Number	#
Received	
Reviewed by Const	
Reviewed by Des	
Reviewed by Proj Mgr	
Reviewed by SDOT	
Revised As-Built	
Scale	H. 1"=20', V. 1"=10'

Sheet Custom Properties

OK Cancel Help

Notice that in the above picture the field called “Line 3: Sheet Custom Title” is filled in as “SEWER PLAN & PROFILE”. This field will show up as green text in the lower-right corner of the sheet. Our standard is to fill out the “Line 3...” field as the “Sheet Description” because this field will also be referenced on the cover sheet in the sheet index. The “Line 1...” and “Line 2...” fields are optional and can be used if needed.

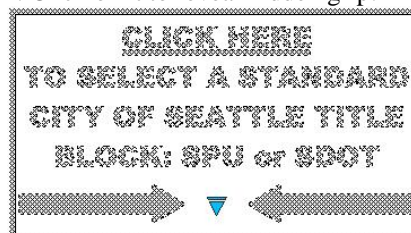
When finished hit OK.

Double-click on the sheet to open it and then select the correct titleblock:

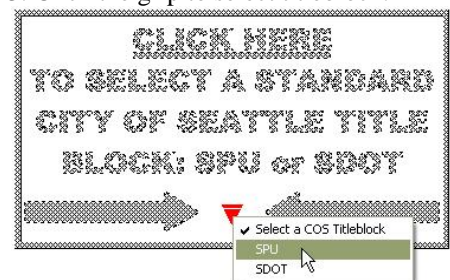
1. You will see this:



2. Click on it to reveal hidden grip:



3. Click the grip to select titleblock:



As in the pictures above, click on the box to select either the SPU or SDOT titleblock.

You will see a title block with fields already filled in for you based on the properties of the sheet set and the sheet (see following picture).

The image shows a CAD drawing sheet with a large empty drawing area and a title block at the bottom. The title block contains the following information:

- Scale:** 0 1/8" = 1' (1/8" = 1')
- APPROVED FOR ADVERTISING:** [Signature]
- DEPARTMENT OF EXECUTIVE ADMINISTRATION:** [Signature]
- NAME OF INITIALS AND DATE:** [Field]
- REVISIONS:** [Table with columns for Revision, Description, and Date]
- CITY OF SEATTLE:** [Logo]
- BALLARD ROADSIDE RAINGARDENS, RETROFITS:** [Text]
- 90% DRAWINGS:** [Text]
- Sheet Set Manager:** [Fields for Sheet Set Name, Sheet Name, and Sheet Number]
- North Arrow:** [Symbol]
- Scale Bar:** [Symbol]

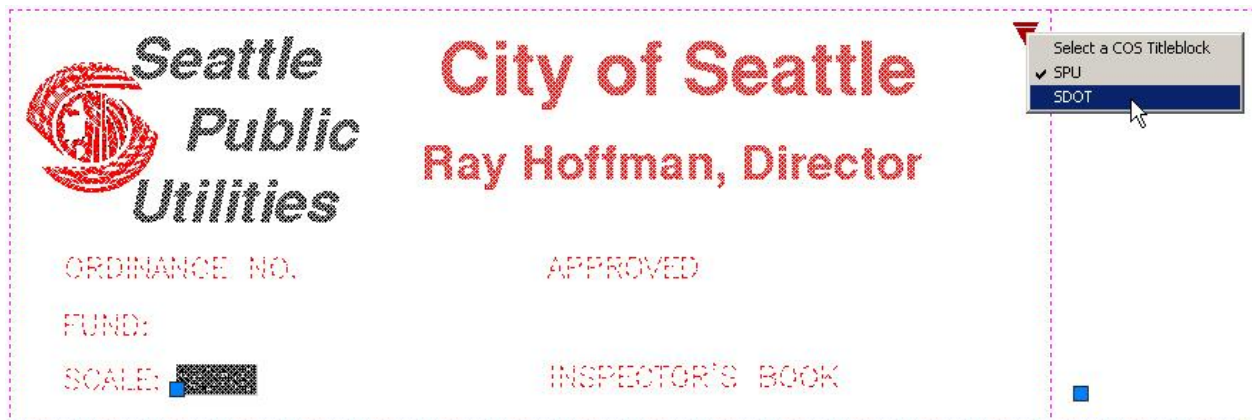
NOTE: If you right-click on the sheet set or the sheet and edit the properties, you will need to “REGEN” the drawing to see the changes in the drawing.

If you need to display a profile grid on a sheet, simply thaw the layer called C-ANNO-GRID (you may need to REGEN). A profile grid block with attributes will appear. Simply double-click on it to edit the left and right elevation attributes. When you overlay an XREF of a profile drawing in model space and create a viewport on the grid, you can align the profile elevations with the profile grid block elevations by selecting the viewport box and snapping one of the XREF’s elevations perpendicular to the appropriate profile grid block elevation. Then set the XREF’s profile grid & elevation layers to not plot.

You can switch between the SPU titleblock and the SDOT titleblock simply by selecting the titleblock and clicking on the triangle grip next to the City of Seattle logo (see following pictures).



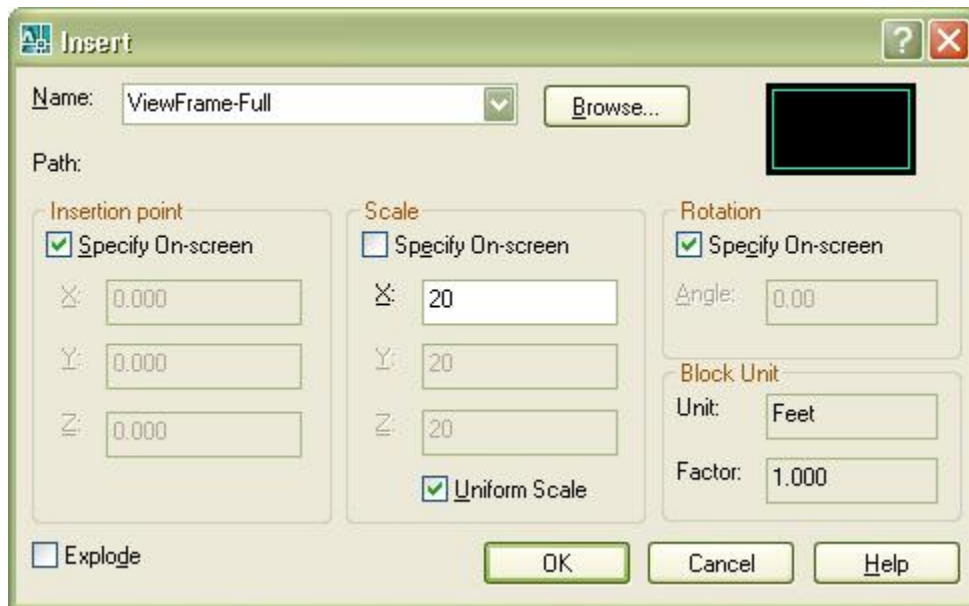
Click on the triangle grip to select either the SPU or SDOT titleblock.



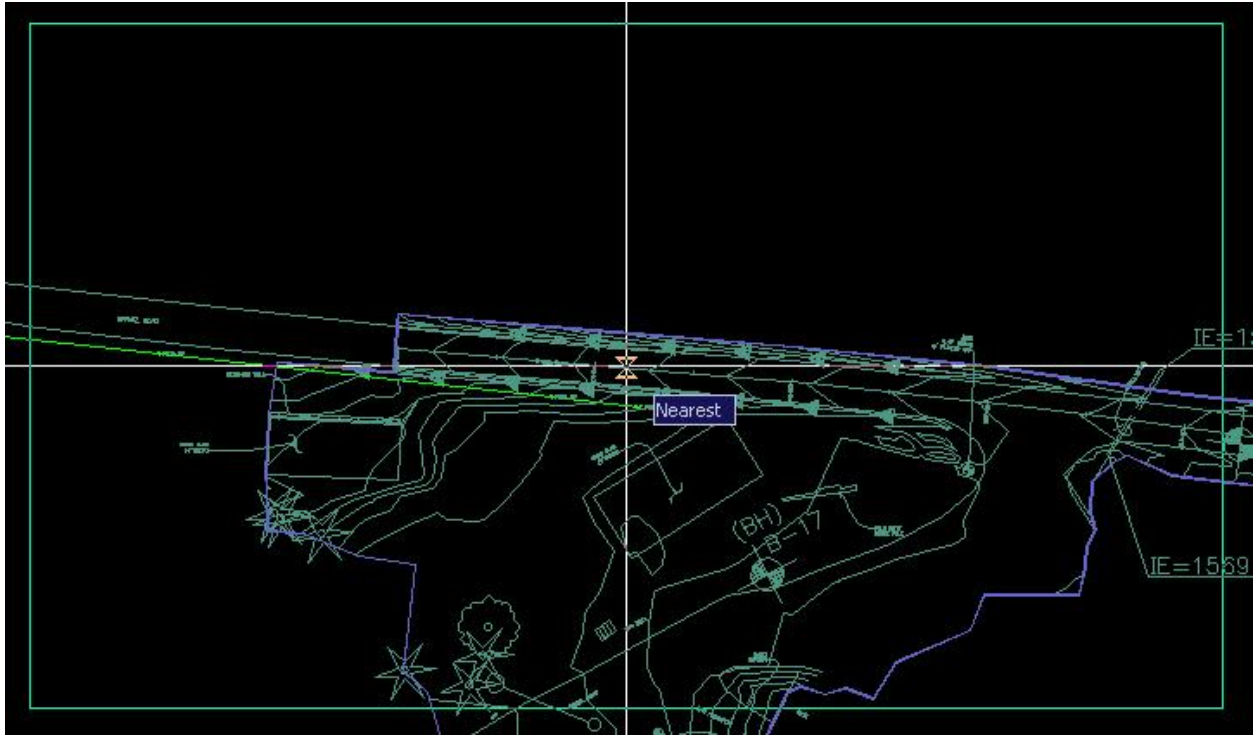
Creating XREF Views

Open one of your sheet drawings through SSM that you want to add a view to. Set the C-VIEW-FRME layer current and draw a rectangle (command: RECTANG) where you want the view to go. It doesn't have to be perfect as the viewport can be adjusted later. WBLOCK the rectangle out and name it something like "ViewFrame-Full.dwg" (delete it from the drawing). Open an XREF containing your linework and insert your newly created view frame block into it.

When inserting this view frame you can specify the scale you will want to see in your viewports (see following picture). If you will be printing your drawing at 20-scale, set the scale to 20. If you will be printing at 100-scale, set it to 100. And so on...



Insert the view frame using the Nearest OSNAP on an alignment.



Then, using another Nearest OSNAP, drag and click on the alignment to align the view frame with the alignment (see following picture).

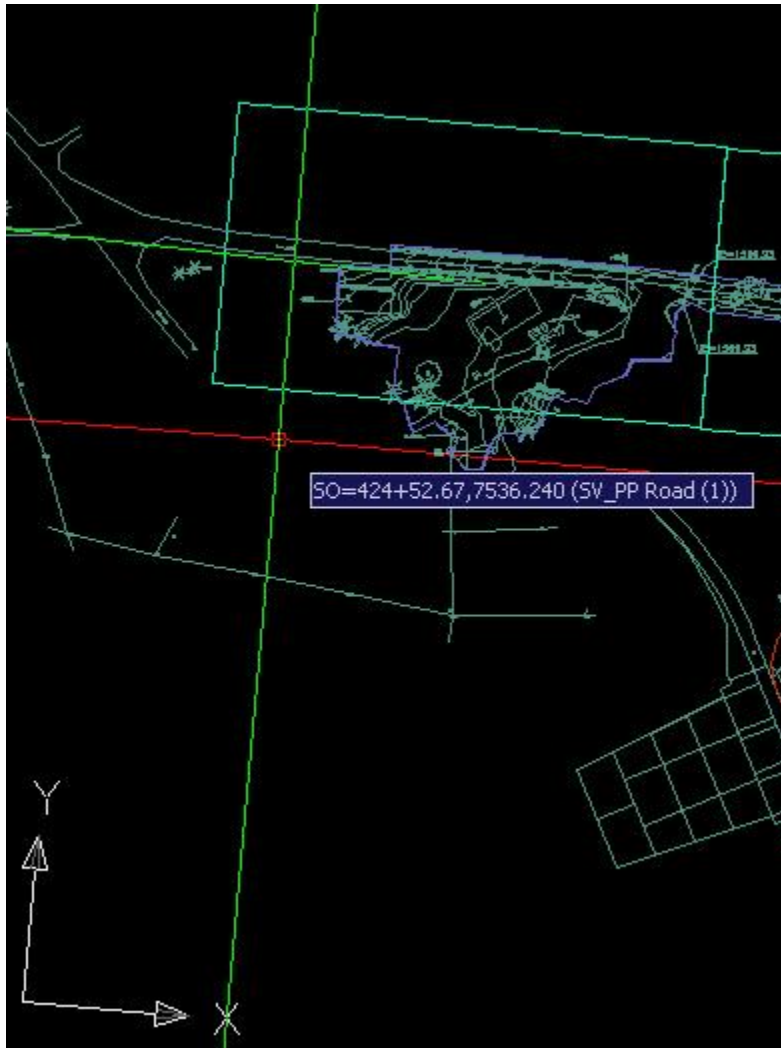


If you want to move the view frame edge to align with a specific station, you can move the view frame at the intersection (OSNAP) of the frame edge and the alignment, and snap it to a station using the Insert OSNAP (see following picture).



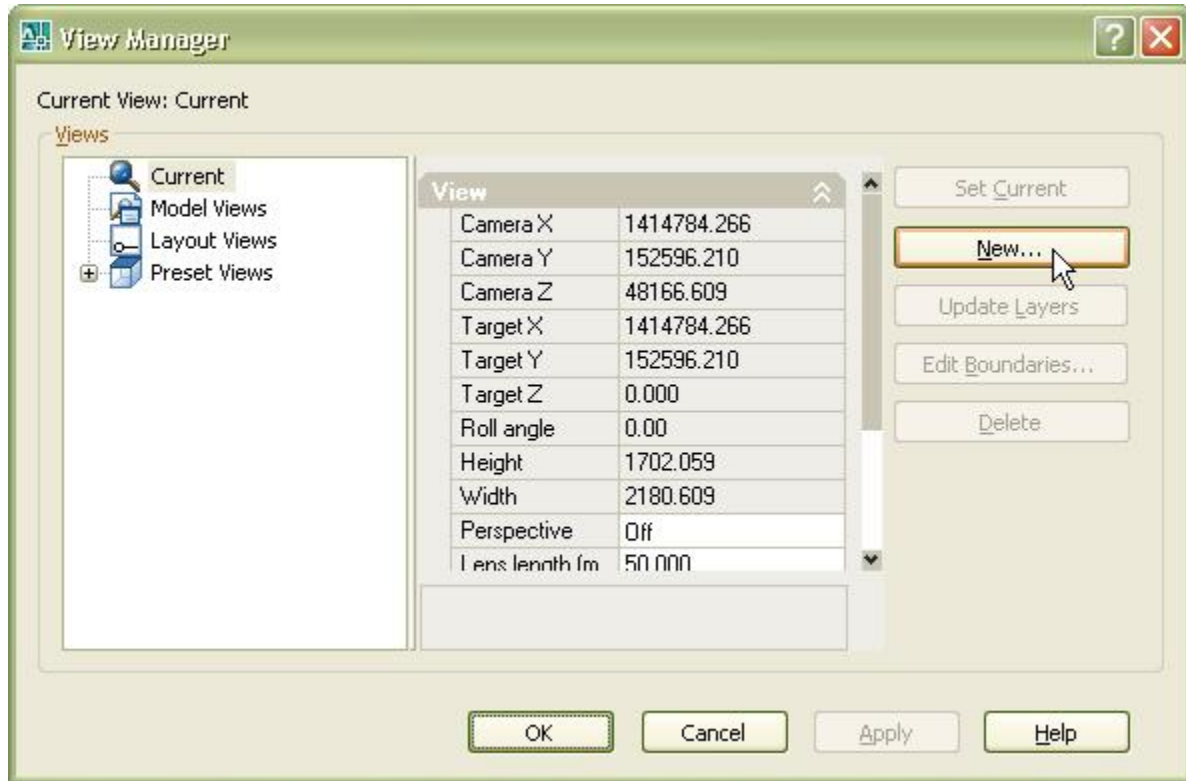
If you only need one view, then you're done. If you need more than one view, from this point on, you can either repeat the steps above to insert another view frame, or you can copy the current view frame as many times as you need.

Next you need to align your UCS with the first view frame. To do this type UCS on the command line. Then type OB (for OBJECT) and select the bottom of a view frame (see following picture).

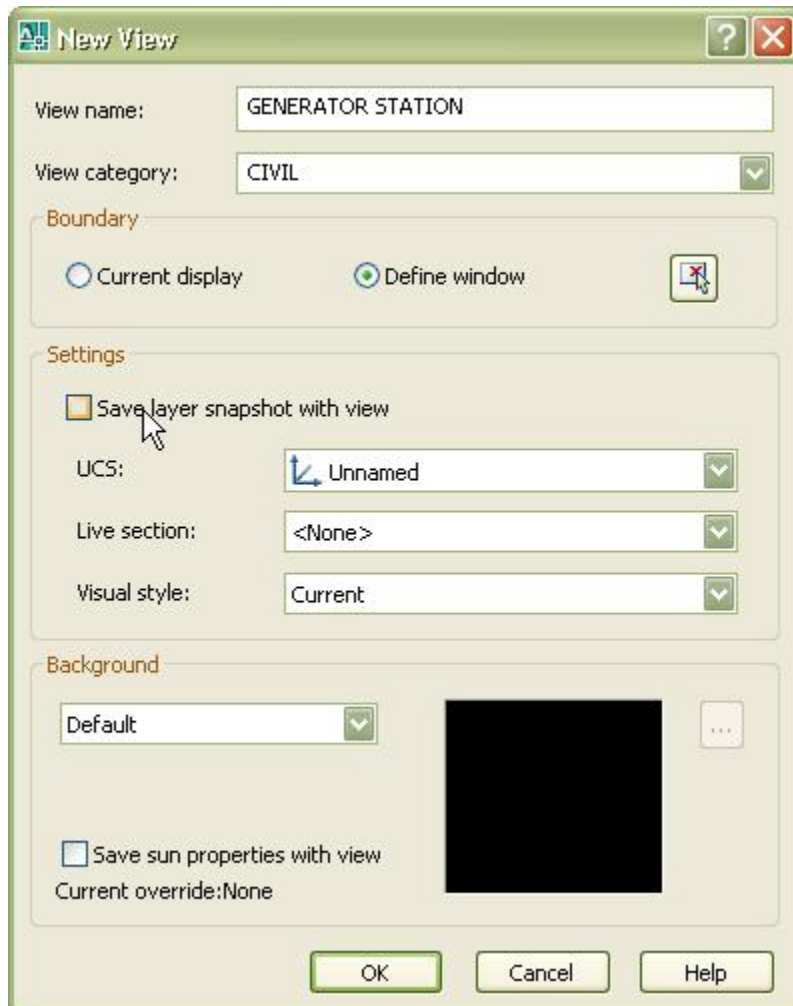


Then type PLAN on the command line and hit Enter twice.

To create a view, simply type V (command: VIEW) and click the “New...” button create a new view (see following picture).



Give the view a name and type a category name (optional). Make sure you uncheck the “Save layer snapshot with view” checkbox (see following picture).



Click the “Define window” radio button to set your view. Snap, using the END or INT OSNAP, to the corners of the view frame.



Then hit Enter to accept the window definition.

Repeat the steps above to create more views.

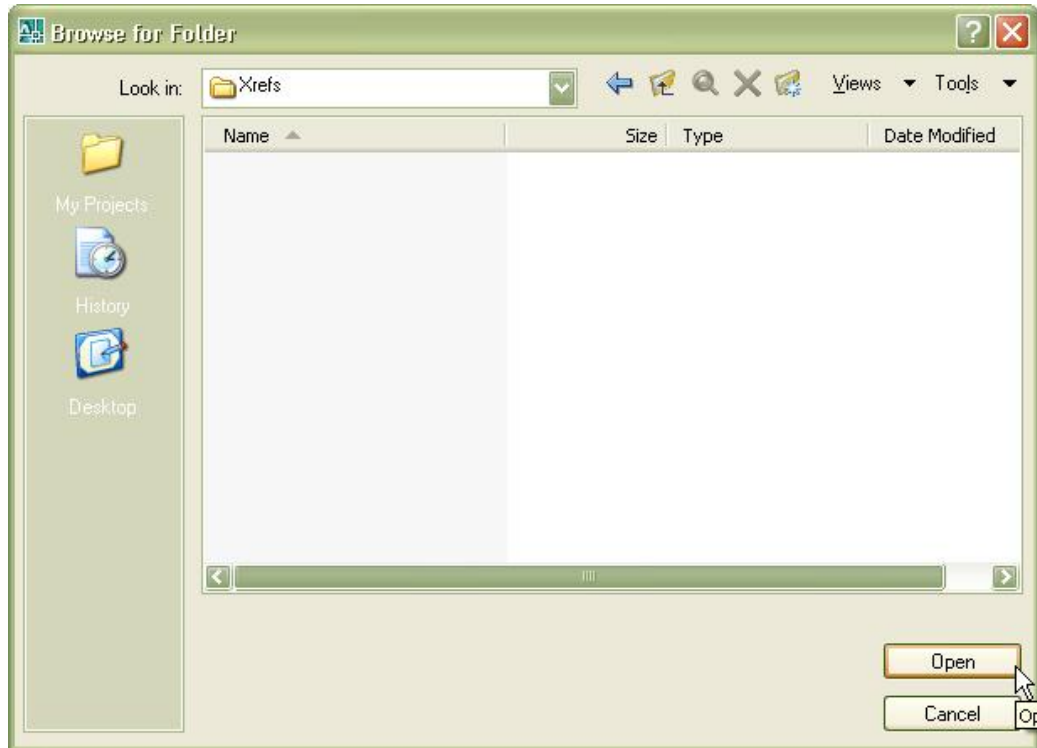
NOTE: Be aware that if your view frames rotate, you may need to re-align the UCS with every view.

Creating Viewports

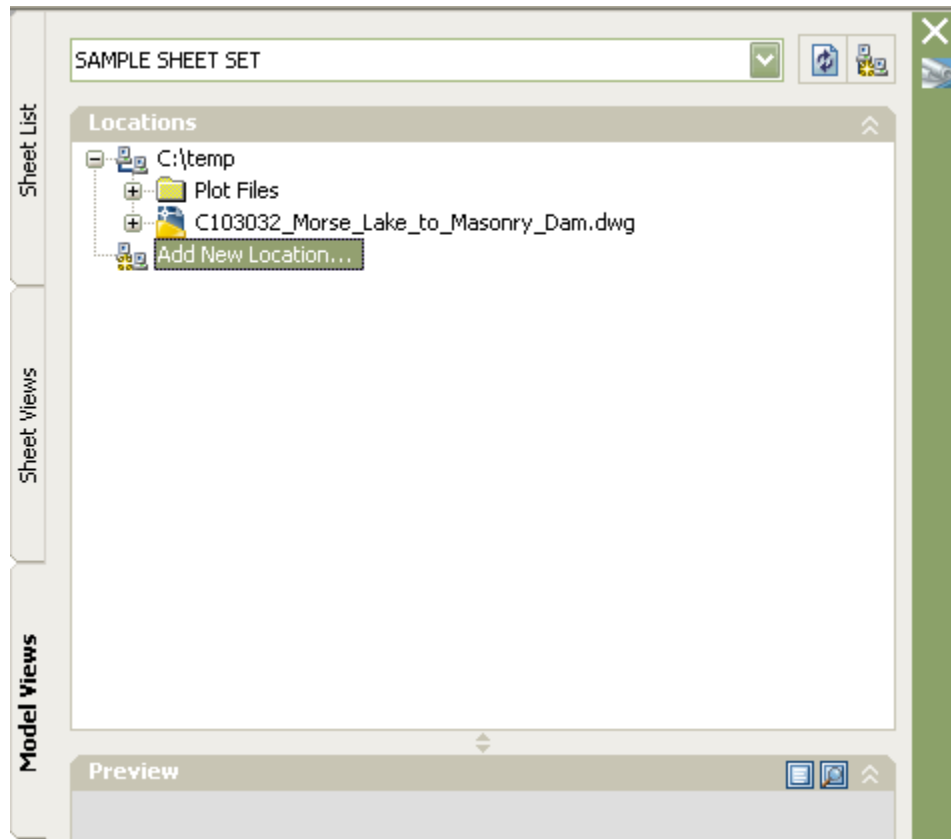
In Sheet Set Manager select the “Model Views” tab and double-click on “Add New Location...” (see following picture).



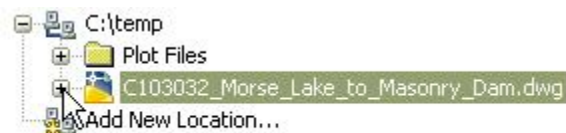
Browse to the location where your XREF files are located and click the “Open” button. The “Browse for Folder” dialog box will appear blank even though drawings exist in the folder (see following picture).



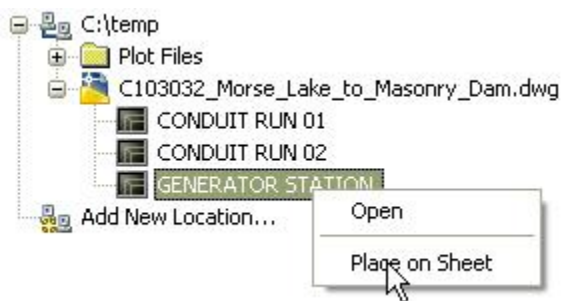
If xrefs are stored in more than one location, add another location by following the same procedure shown above (see following picture).



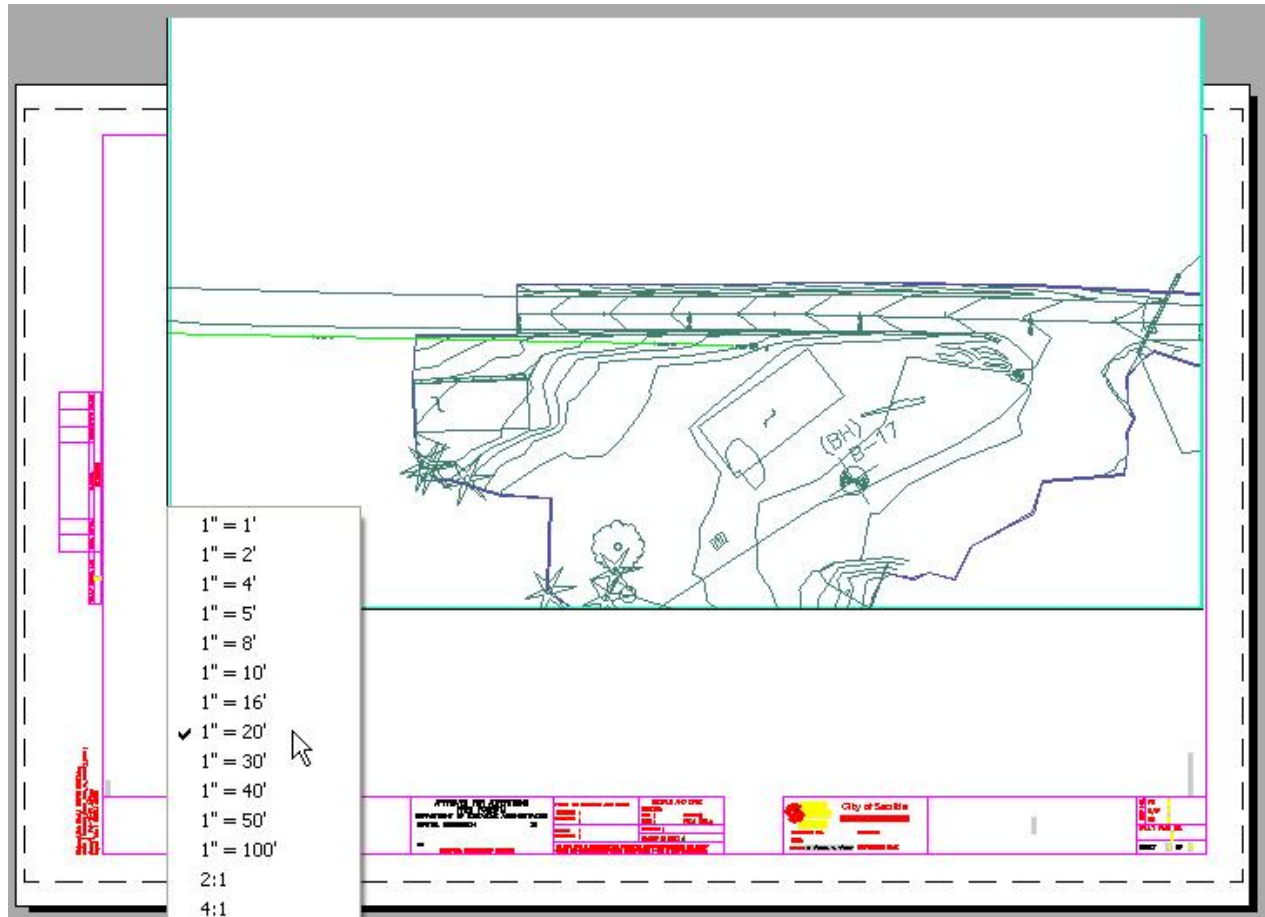
Click the + icon next to the XREF name to reveal the views contained in the drawing (see following picture).



Right-click on a view name and select "Place on Sheet" (see following picture).

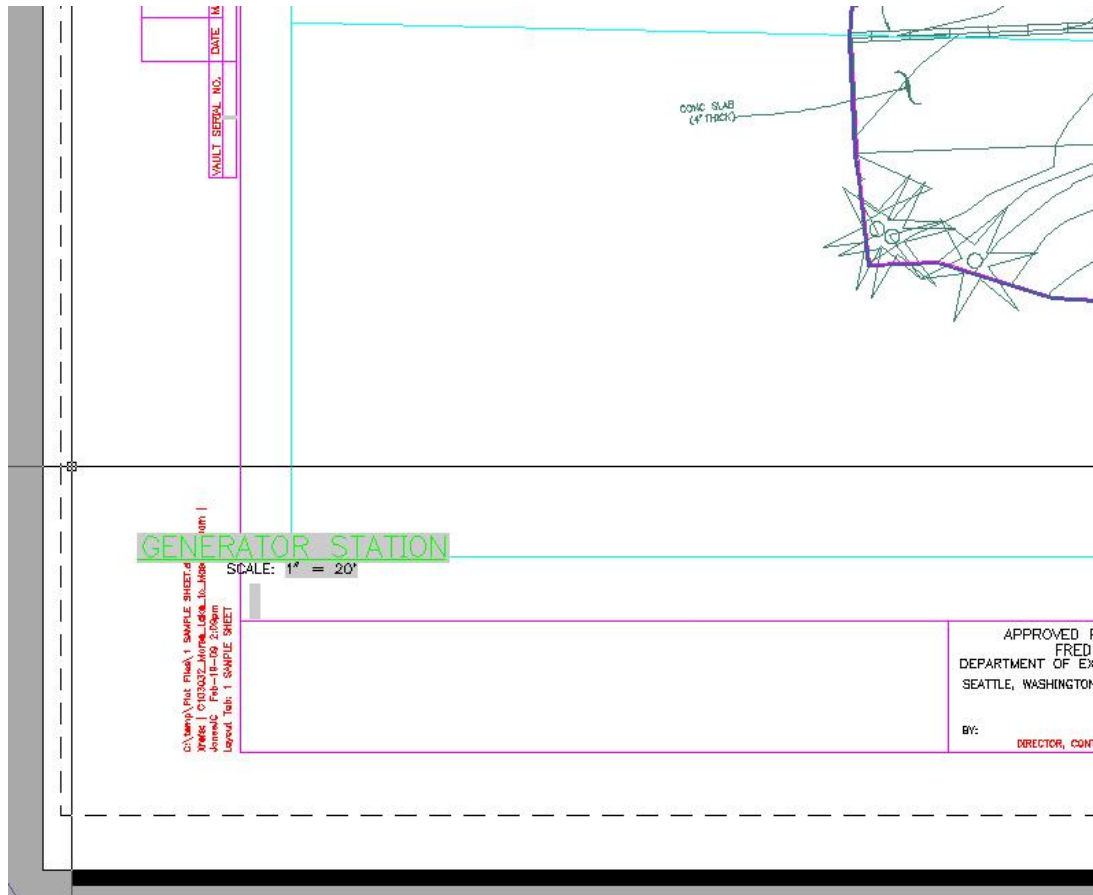


Right-click to set the scale of the viewport (see following picture).



You will notice that it automatically puts the XREF in model space, creates a viewport box and inserts a view title.

NOTE: The view title (see following picture) is added for your convenience for detail views but is not required for all plan and profile views. You can delete the view title if it is not needed. If you accidentally delete a view title and need to re-insert it, simply right-click on the appropriate view in the Sheet Views tab and select “Place View Label Block”.



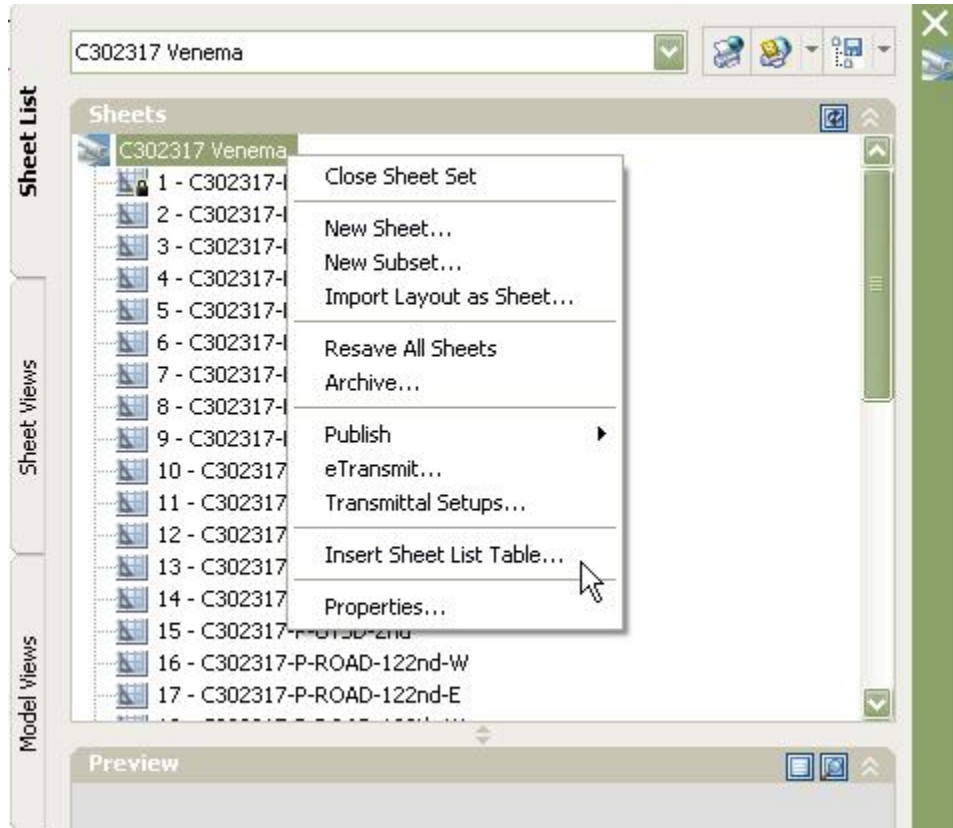
WARNING: Be aware that Sheet Set Manager automatically “freezes” all other layers in that viewport. If you want anything else to show in that viewport you will need to “thaw” layers in that viewport.

CONCEPT: When placing a plan view on a sheet such as a base map, generally you will want to show another XREF (such as a water or drainage design) on top of it. To do this, you do not need to follow the process above and place another view in the sheet. All you need to do is go into Model Space and overlay an XREF. However, you must be aware of the warning above about layers frozen in that viewport. If you overlay an XREF and it doesn’t appear in the viewport, check your layers and thaw them in that viewport.

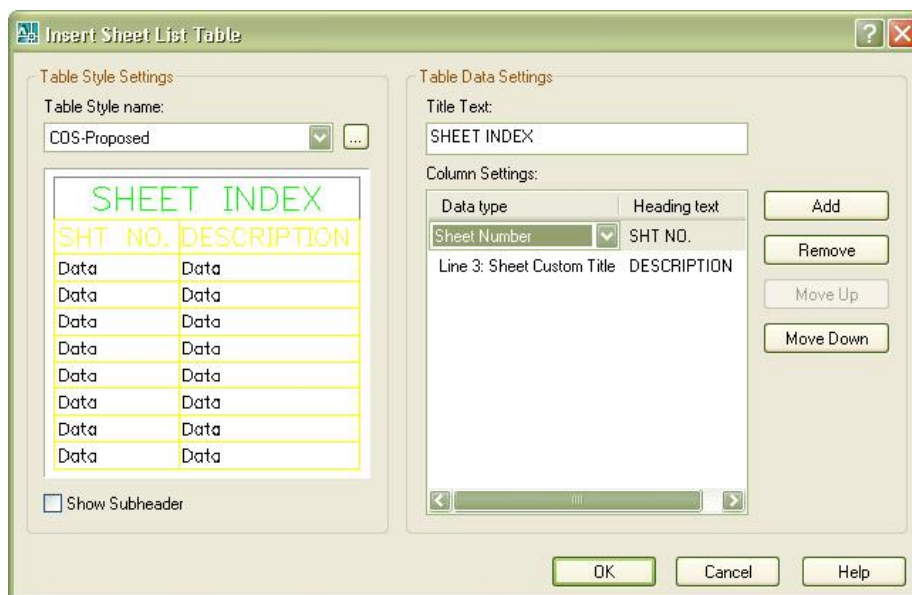
At this point you need to change these three objects to the correct layer: Change the viewport box to the C-VIEW-FRME layer; change the view title to the C-ANNO-TITL layer; switch to model space and change the XREF to the correct layer (X-****).

Creating a Sheet Index

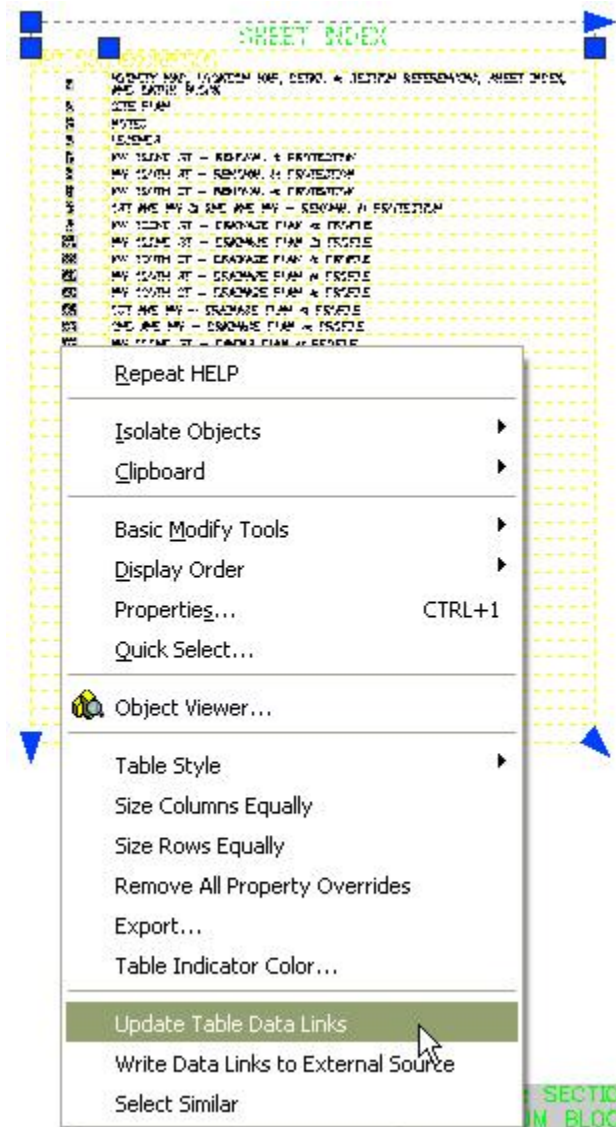
To create a sheet index on the cover sheet, first open the cover sheet drawing. Then in Sheet Set Manager on the “Sheet List” tab, right click on the Sheet Set (top item) and click on “Insert Sheet List Table...” (see following picture).



You will get a dialog box that looks like this:



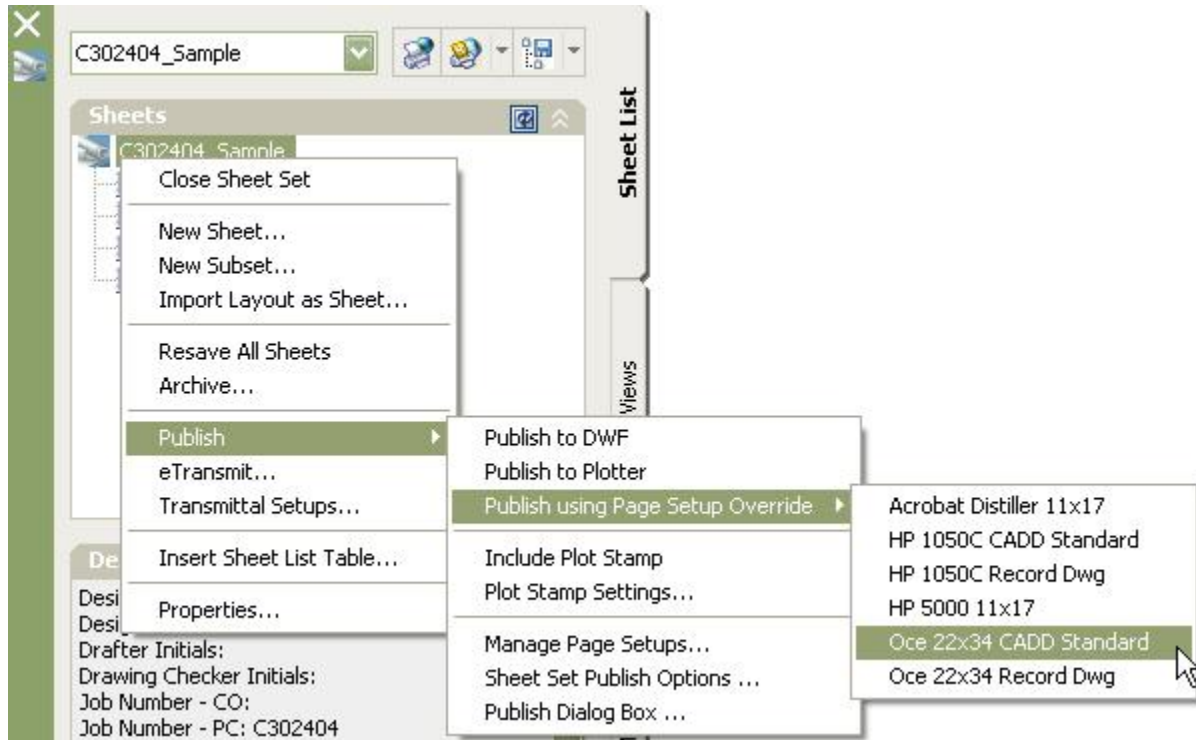
Click OK to insert the sheet index on the cover sheet. When you add, delete, renumber, or rename sheets (by editing the Line 3: Sheet Custom Title field), you need to update the table. To do this, right-click on the table and select “Update Table Data Links” (see following picture).



Publishing

Open COS_SheetSet.dwg and right-click on the “Plot” tab and select “Page Setup Manager...” Create page setups for your plotters, and then save and close the template file.

To publish (plot) a set of plans in your sheet set, in the Sheet List tab of Sheet Set Manager right click on the sheet set and select Publish → Publish using Page Setup Override → [select a page setup override].



This will plot all the sheets in your sheet set according to the settings in the page setup that you selected. Please note that the page setup overrides will only work if you have the plotters installed correctly on your computer.

NOTE: When creating/editing page setups in the template (DWT file), you must set the “Plot area” to either Layout or Extents. SSM will ignore page setup overrides with plot areas set to Display or Window.

TIP: To setup/modify a Page Setup Override for your plotters/printers, simply right-click on your sheet set and select:

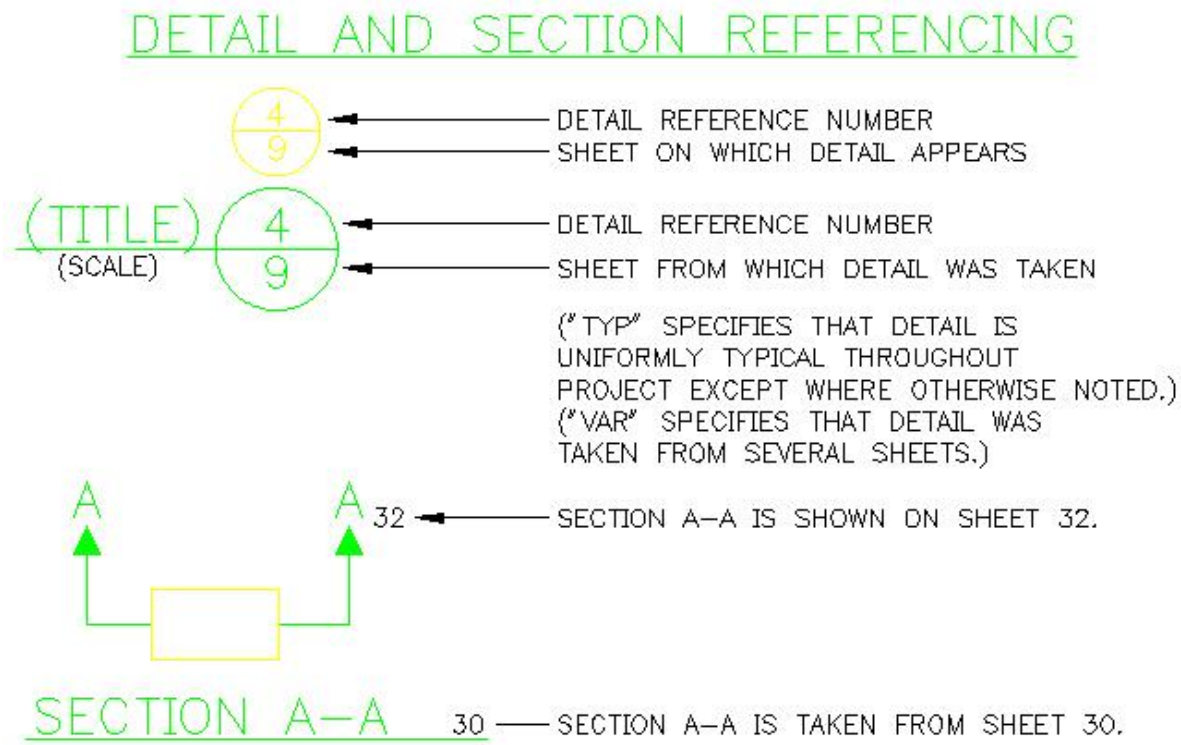
Publish → Manage Page Setups...

This will open up the Page Setup Manager for the DWT template file. Generally we setup our plot areas to Extents and select the “Center the plot” checkbox. But we realize that sometimes it is easier to use a different plot area such as Display or Window. When first creating your page setup, it is ok to use Display or Window plot areas, but because SSM doesn’t support those plot areas you will eventually need to change it back to Layout to be usable in SSM.

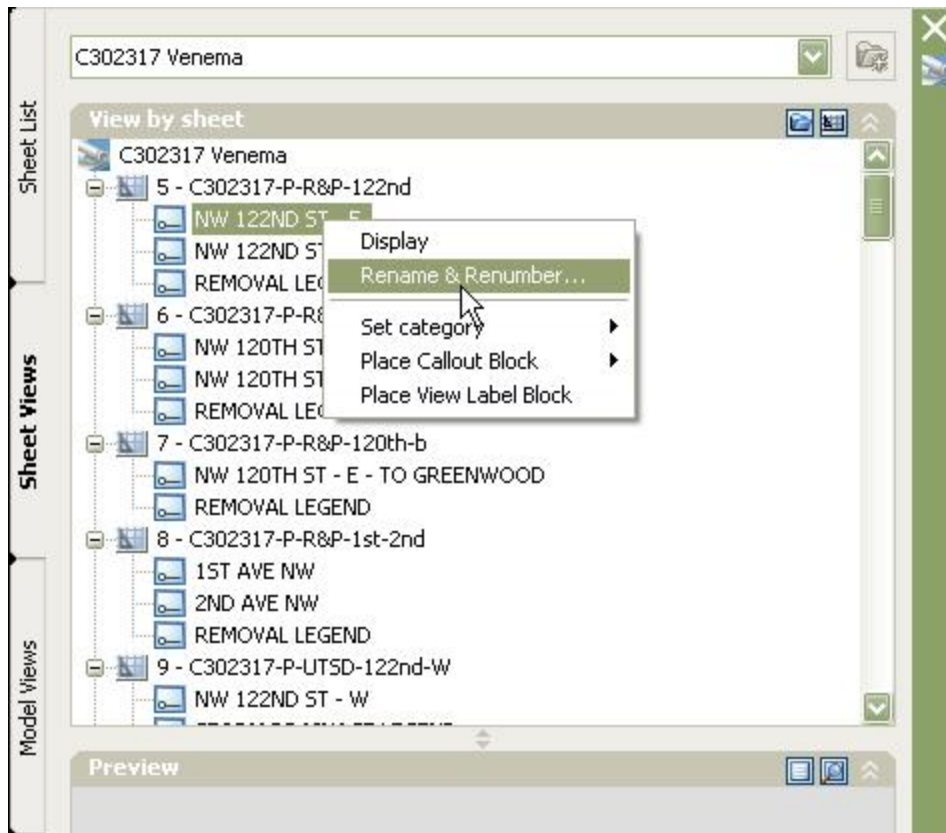
For example, if you find it easiest to setup the plot area with “Window”, go ahead and do so. Hit ok in the Page Setup dialog box to save it. Then modify your Page Setup again and change it from Window to Layout. The Layout plot area will maintain the same plot area previously set by the Window plot area and it will now be usable as a Page Setup Override in SSM.

Placing Callout Blocks for Detail/Sheet Cross-Referencing

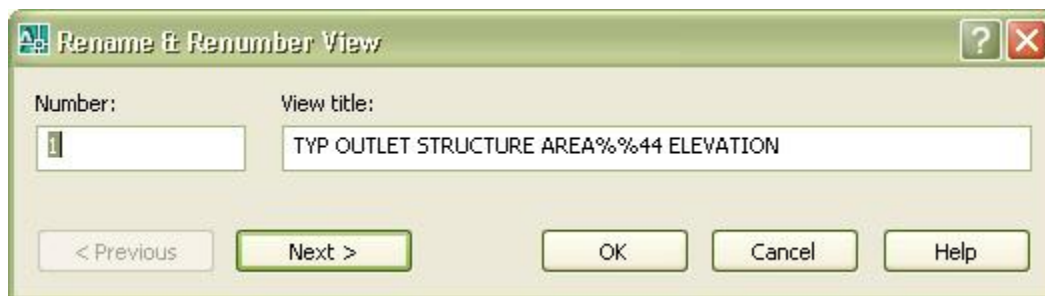
Here is an example of our standard method of cross-referencing between sheets and views:



It is important that you number your views in Sheet Set Manager. This enables you to cross-reference between views and sheets using callout blocks that contain Sheet Set Manager fields. To number your views, click on the Sheet Views tab, expand the sheet to see the views, and right-click to select "Rename & Renumber..." (see following picture).



Here is an example of renaming and renumbering a detail view:



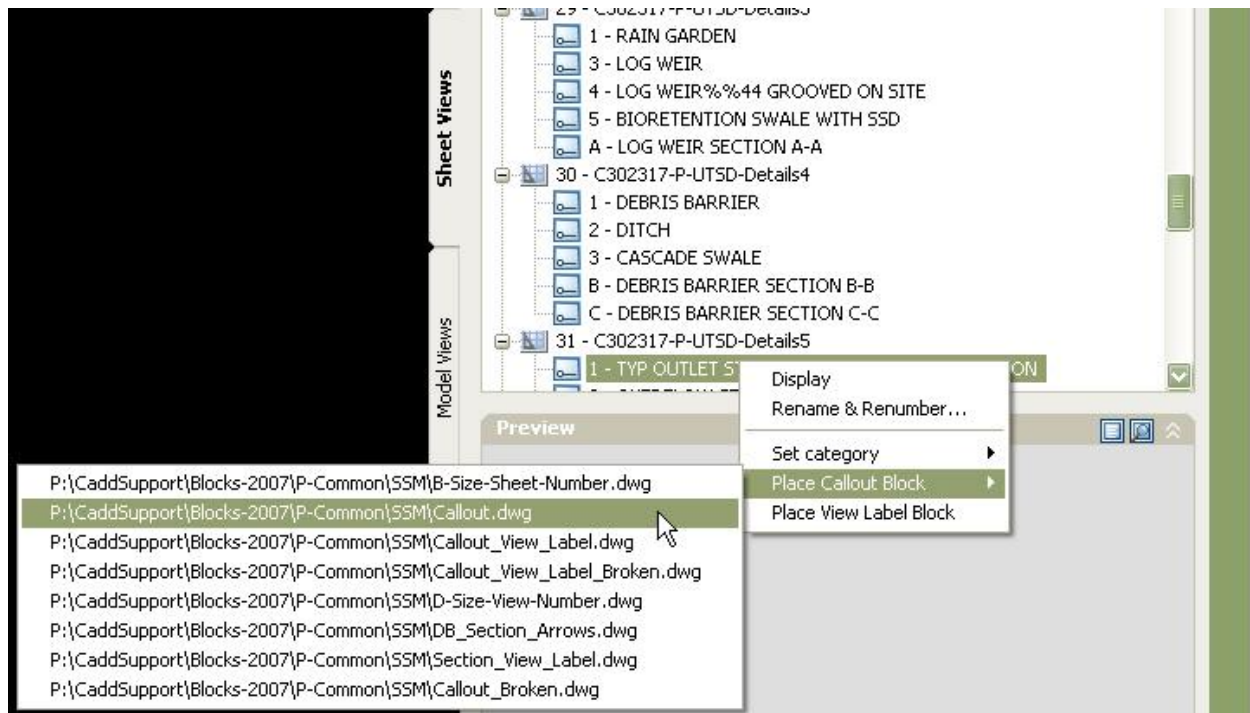
Notice in this example of a detail view, it has been numbered as 1 and the title contains %%44 to represent a comma.

TIP: “Number” section views with letters, and all other views with numbers. For example a Section A-A will be numbered with the letter A. When placing a section callout block, it will refer to the letter A and display the section view title properly.

Once your views have been named and numbered properly, you can place all kinds of callout blocks in any drawing. To place a callout block in a drawing, right-click on a view and select:

“Place View Label Block”, or...

“Place Callout Block” → [select a block]



View Label Block (C-view_label-DB.dwg)

This block is our standard detail view label that contains the view title and scale under it.

C-callout.dwg

This block is placed in XREF drawings.

C-callout_broken.dwg

This is just like the C-callout.dwg block except that it allows for more than one sheet to be referenced.

C-callout_view_label.dwg

This block is placed next to View Label Blocks. The “tail” should line up with the “underline” of the View Label Block.

C-callout_view_label_broken.dwg

This is just like the C-callout_view_label.dwg block except that it allows for more than one sheet to be referenced.

C-section_arrows-DB.dwg

This is our standard section arrows dynamic block.

C-section_view_label.dwg

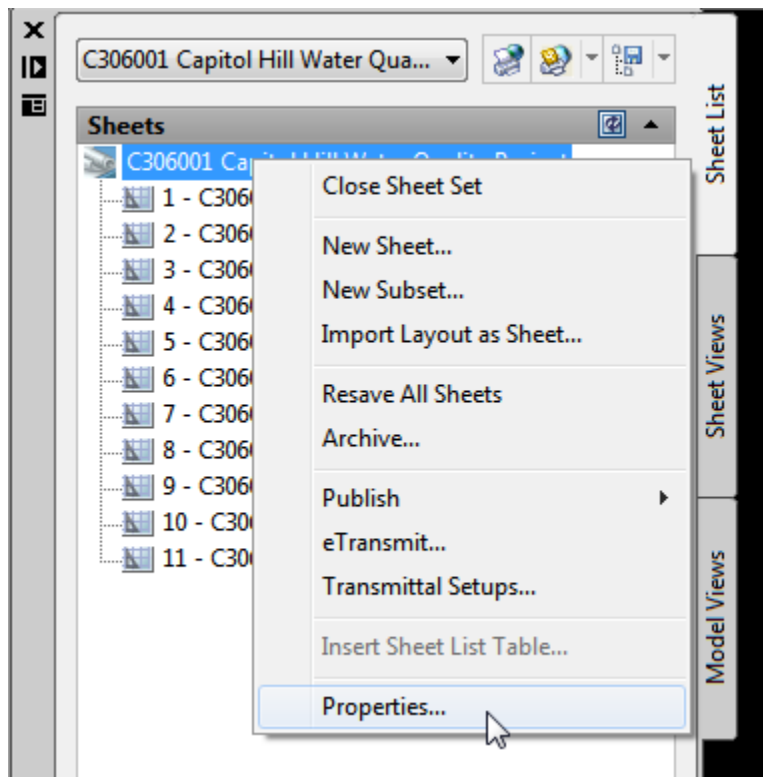
This block replaces the View Label Block for section views.

Update Barcodes on Record Drawing Sheets

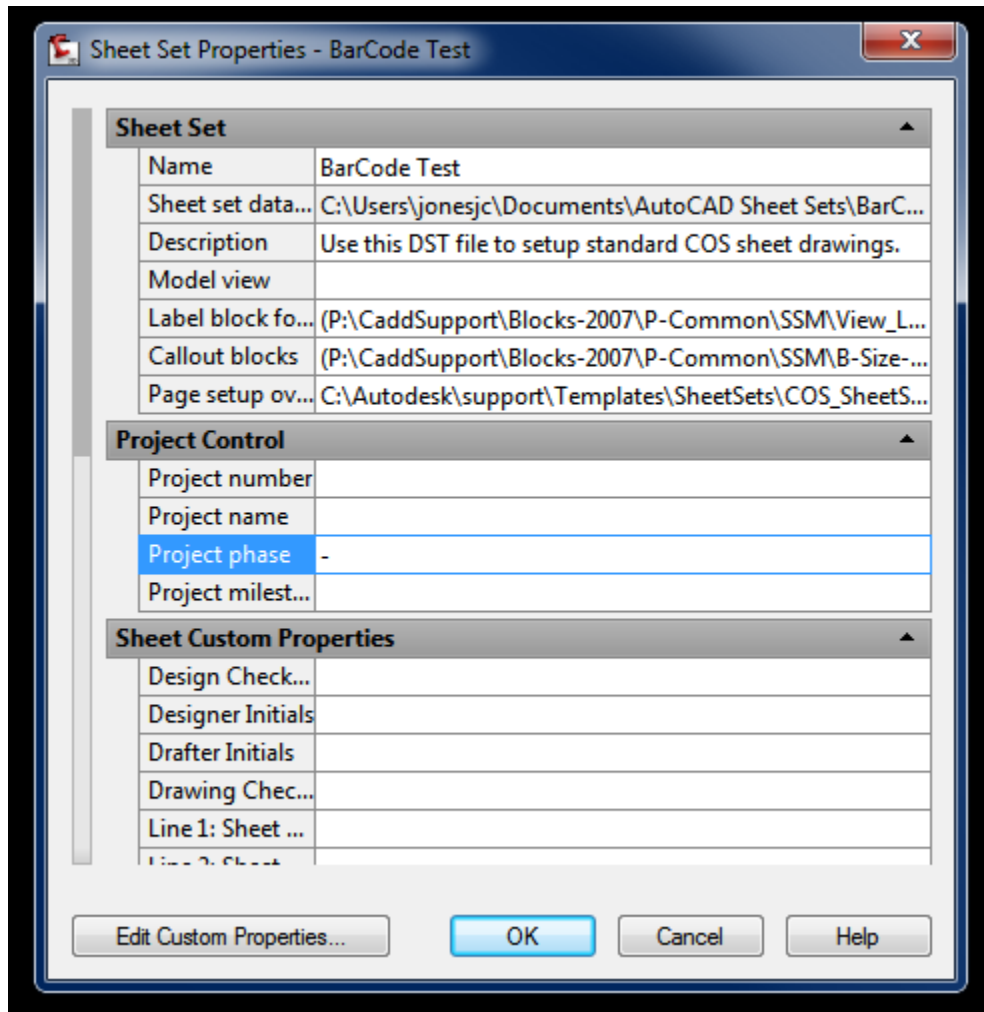
All sheets contain a barcode for indexing in the Engineering Records Center (ERC). When a sheet set is converted into a “Record Drawing” sheet set, the barcodes need to be updated to reflect this.



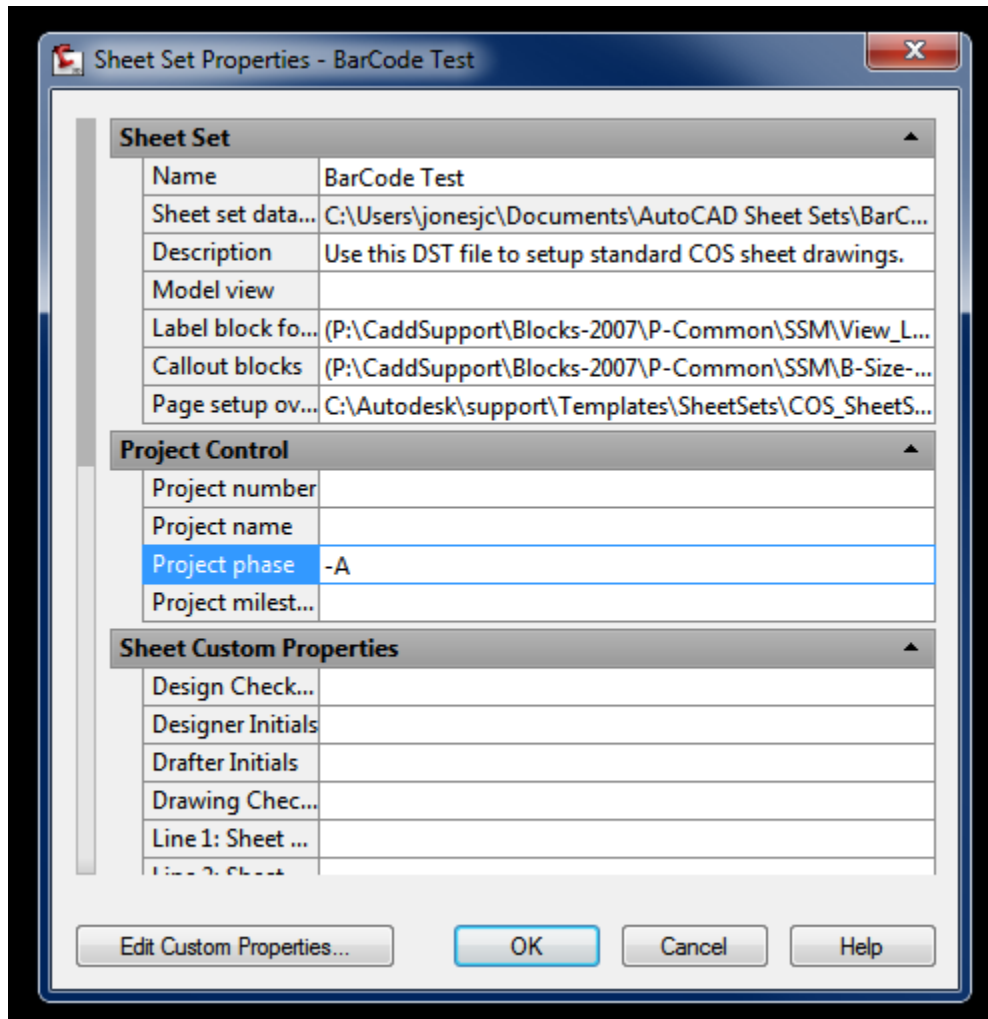
To do this, open the Sheet Set, right-click on the sheet set name at the top...



...and select “Properties...” Look for the “Project phase” field:



Simply add an **A** after the hyphen in the “Project phase” field:

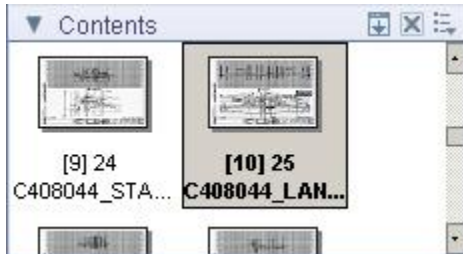


Do this and all the barcodes in the entire sheet set will be updated next time you print.

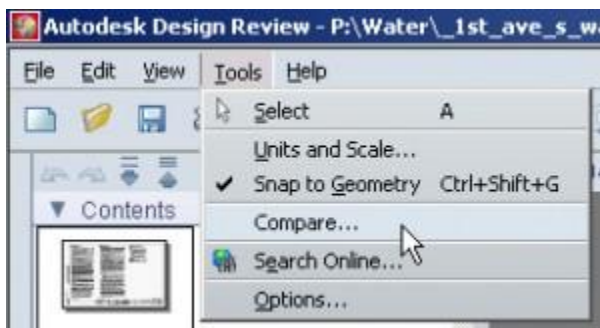
Appendix 7: Working With Autodesk Design Review

Autodesk Design Review is free software that you can use to view, print, markup, and measure AutoCAD drawings. I am going to show you how to compare design changes with it.

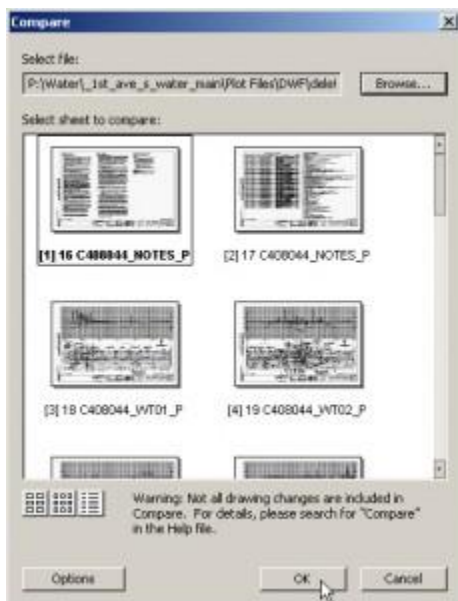
Open a DWF in Design Review and select a sheet that you want to compare.



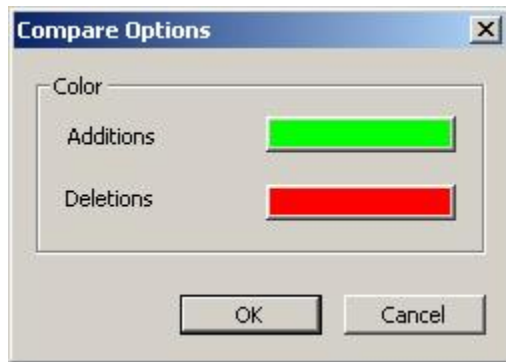
Go up to “Tools” and select “Compare...”



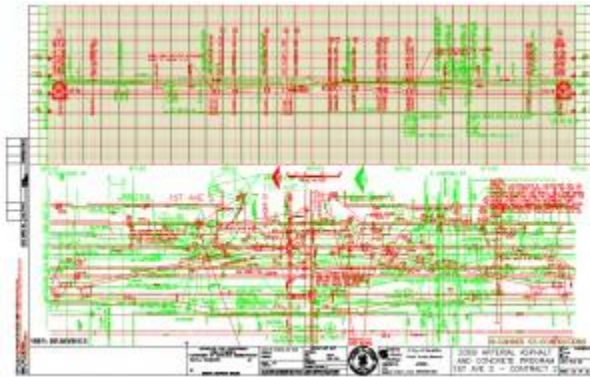
Browse to find a DWF of the same drawing set, created at a different time. Then select the same sheet that you currently have open in Design Review.



If you want, you can change the default colors for things that were deleted or added between the sheets.



Final result is essentially an automatic markup of the DWF sheet showing what is new and what has been deleted.



(the sheet shown above was compared to a completely different sheet to show exaggerated differences)